ENGINEERING
LIBRARY

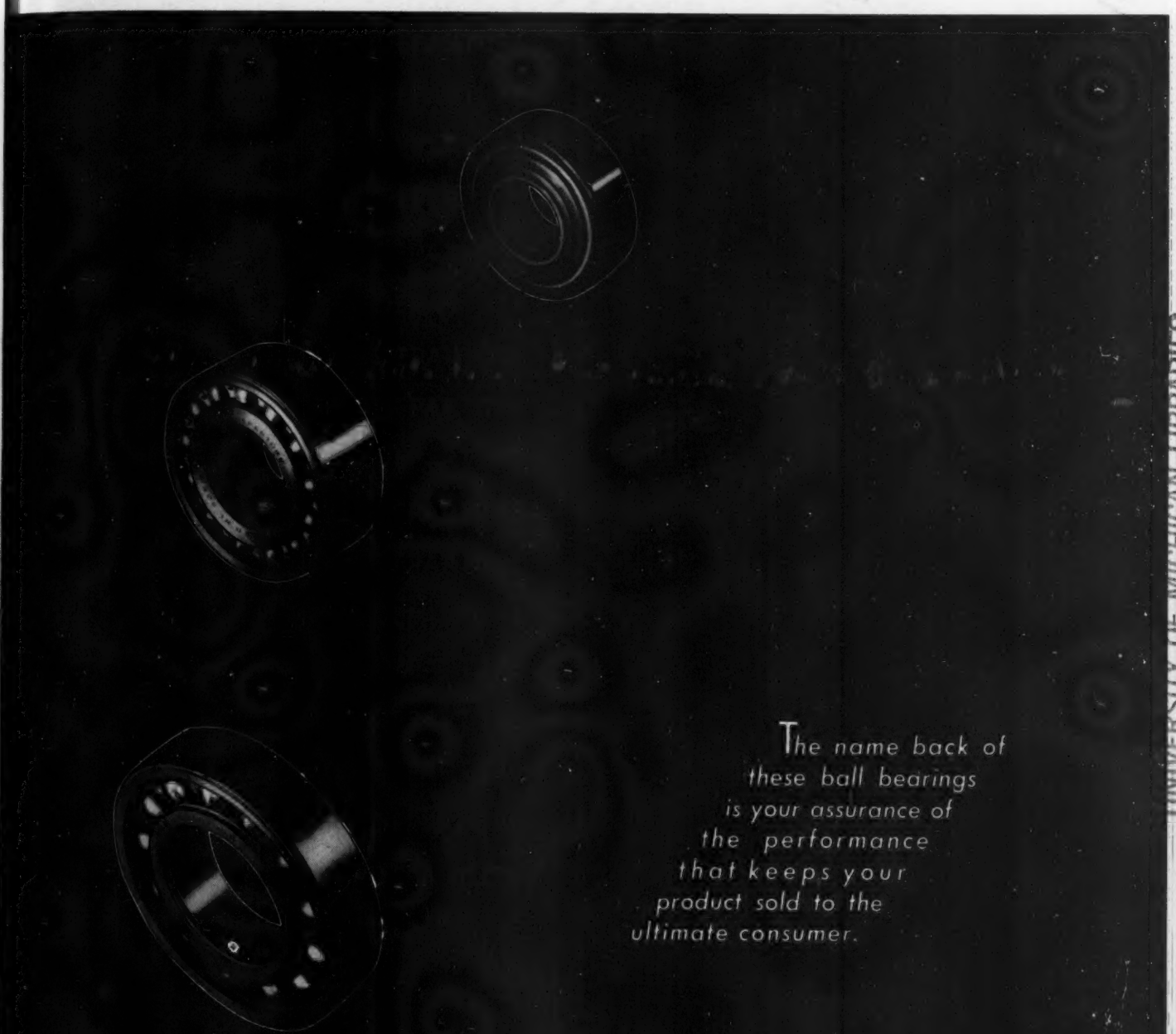
MAY 1949

May 9, 1949

STEEL

The Magazine of Metalworking and Metalproducing

CONTENTS — PAGE 45



UNIVERSITY OF MICHIGAN LIBRARIES

LOOKING FOR EXTRA CORROSION RESISTANCE?
HIGH TEMPERATURE STRENGTH?

LOOK INTO CROLOY

16-13-3

(TYPE 316)

SEAMLESS & WELDED

STAINLESS STEEL TUBING

FOR MECHANICAL USES

Available also in modified analyses 18–13–3 (Type 317) for extreme corrosion conditions, and 16–13–3cb (Type 316cb) for applications where heat-treatment after welding is impractical. Ask for Bulletin TDC-133 describing physical, mechanical and fabricating properties of these analyses.

TA-1467-S

BABCOCK & WILCOX SEAMLESS & WELDED TUBES

THE BABCOCK & WILCOX TUBE COMPANY
General Offices: Beaver Falls, Pa.
Plants: Beaver Falls, Pa., and Alliance, Ohio
A full range of Stainless, Alloy and Carbon Steel Tubing for all Pressure and Mechanical Applications

Using Eaton Springtites or Sems frees hands—saves motions—making continuous production possible. Only 3 motions for a complete assembly instead of 8.

Not using Springtites or Sems requires many extra motions—causing delay, loss of parts, and reduced production all along the assembly line.

The Camera Doesn't Lie...

here's how EATON *Springtites* and *Sems* reduce costs

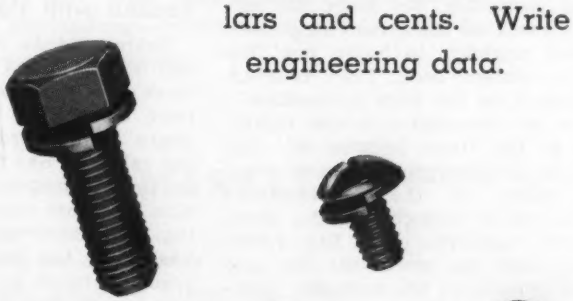
Today, assembly line employees' time runs into money. Where time can be saved and production increased, costs are reduced—overhead spread thinner.

Through the use of Eaton *Springtites* or *Sems* a correctly-engineered unit is assured with a minimum of motions. The intangible savings in paper work, automatically-balanced inventories and elimination of lost parts cuts overhead—saves money.

We can prove what these savings mean to you in dollars and cents. Write for engineering data.

RELIANCE SPRING LOCK WASHERS automatically keep bolts, nuts, screws, tight under constant tension—compensate for wear and developed looseness. All sizes and types. Write for Spring Lock Washer bulletin.

RELIANCE RINGS — snap, bearing, lock and retainer—form strong shoulders on shafts or in counter bores and on outer races of bearings. Speed production, cut costs—save time and material. Write for engineering bulletin.



Springtites

EATON

EATON MANUFACTURING COMPANY

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

UNIVERSITY OF MICHIGAN LIBRARIES

Behind the Scenes...

From Sunset Country

If you see a lot more material in our editorial columns with a Western flavor, you can blame Editor Irwin Such. He's just back from an extended tour of the western states, filled with new ideas and story leads. Seems that the boys out there did a real selling job. They put his picture in the newspapers, even. They interviewed him on industrial topics of the day, aired his views on western industry, and filled him with sunshine and orange juice. Claims he wasn't on a horse, though, and didn't bring back any saddles or ten gallon hats.

What Don't You Like?

We've been trying real hard to figure out what you readers wouldn't want to hear, so we could print it here, and cast some doubt upon the veracity of a radio speaker we chanced to overhear the other day. This character (we didn't last long enough to find out who it was) claimed that the trade press existed only to tell readers things they want to hear. We know, just from looking at the mail around here, that everybody isn't happy about anything we print; that nobody is happy about everything we print; that nothing we print makes all readers happy; and that we never print anything that pleases nobody. That will give you some idea of the complexity of the editors' job. Walking a tightrope is simple compared to the job of keeping over 100,000 readers happy. But we still can't figure out what to put in this column that you won't like—all of you, that is!

Back in '99

May 11, 1899—the issue is devoted to a "Midland Special" theme, a special issue highlighting industrial development in Illinois and Wisconsin in particular. No doubt the editors as well as the advertising staff labored mightily to bring out this week's enlarged book. There is much of interest on the area in question—but in all probability it was lightly read at the time, because all eyes were on Pittsburgh. Big news from the valley of the Monongahela pushed off all thoughts of the West. Andrew Carnegie was the newsmaker—and the news was the sale of his interest in the company bearing his name to the other partners. Having consummated the deal, Mr. Carnegie left for Skibo Castle. But before he did, our editors caught him for an exclusive statement. He said nothing at all about the reorganization of the Carnegie company. Others, however, were talking, gossiping and wondering. Main questions seemed to be how much Mr. Carnegie received; what was to be the capital of the new corporation; and was there any truth in the rumors that the partners remaining would bring the Carnegie companies into a billion dollar corporation.

Wash Up for Dough

Ever pay anybody for taking a bath? One outfit in Cleveland does, and finds it is a profitable expense. Cleveland Graphite Bronze reports a virtual elimination of dermatitis and other occupational skin ailments since they started paying bonuses to any workers who would take showers before going home at the end of their shifts. Total cost of the program has proved to be quite small in comparison to the cost of lost time and medical care due to the now-eliminated diseases. Clean profits, no doubt.

Puzzle Corner

Guess we went and got ourselves confused, skipping the answer to the problem of the men in the bar. There were, of course, eight of them, and we really didn't have to give the answer at all. Here's one from H. L. Beohner of the Permutit Co., New York. He asks, "If men had developed with eight fingers instead of ten, and eight toes instead of ten, what would this year be?" That isn't really the **non sequitur** it seems to be, and you ought to come up with an answer in a very few minutes, say about 7 or 8. For any of you who happened to miss last week's answer, which should have been published in this week's column, Sally was 22 years and 8 months old when she registered to vote.

Packed with Packard

Detroit Editor Art Allen has gone and done it again. You'll find in this week's book a most interesting opus from his prolific typewriter, sixteen pages of Packard. It's an interesting tale, and one filled with items on efficient management, good organization, and just plain interesting reading. We know you'll want to head back into the editorial section and read it through so we won't keep you any longer. Hop to it!

Shrdlu

(Editorial Index—page 45)

STEEL

Vol. 124—No. 19 May 9, 1949

BUSINESS STAFF

GEORGE O. HAYS
Business Manager

ADVERTISING

R. C. JAENKE
Advertising Manager

C. H. BAILEY
Service Manager

A. V. ANDERSON
Production Manager

New York:
E. W. KREUTZBERG, K. A. ZOLLNER
CALVIN FISHER, JR.

Pittsburgh:
S. H. JASPER, B. C. SNELL

Chicago:
L. C. PELOTT, V. G. BRETTMAN

Cleveland:
D. C. KIEFER, H. G. ROWLAND
W. L. POLAND

Los Angeles:
F. J. FULLER

•

CIRCULATION AND MARKET RESEARCH

J. W. ZUBER
Director

R. L. HARTFORD
Research Manager

H. E. METZNER
Circulation

G. R. EBERSOLE
Mail & List Service

Field Representatives:
C. A. PRICE, H. R. DUNNE, D. G. HEWITT
B. W. SCHEINERT

•

MAIN OFFICE

Penton Building, Cleveland 13, Ohio
Main 8260

BRANCH OFFICE

New York 17 .....16 East 43rd St.
Murray Hill 2-2581

Chicago 11.....520 North Michigan Ave
Whitehall 4-1234

Pittsburgh 19 .....2806 Koppers Bldg.
Atlantic 3211

Los Angeles 4 .130 N. New Hampshire Ave.
Fairfax 1758

London: 2 Caxton St., Westminster, S.W.1

• • •

Published by THE PENTON PUBLISHING Co., Penton Building, Cleveland 13, Ohio, E. L. SHANER, Chairman and Treasurer; G. O. HAYS, President; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer. Member, Audit Bureau of Circulations; Controlled Circulation Audit, Inc.; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1949 by the Penton Publishing Co.

Editorial Staff on Contents Page

ABC ABP CCA

EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

IRWIN H. SUCH
Editor

WM. M. ROONEY
News and Market Editor

JAY DEEULIS
Engineering Editor

J. D. KNOX
Steel Plant Editor

GUY HUBBARD
Machine Tool Editor

DON S. CADOT
Art Editor

ALLEN G. GRAY
Consulting Editor

ASSOCIATE EDITORS

W. J. CAMPBELL • FRANK R. BRIGGS
VANCE BELL • WALTER F. TOERGE
DAN REEBEL

ASSISTANT EDITORS

HENRY J. HOLTZ • DOLORES K. BLAHA
JOHN S. MORGAN • L. J. SKUDERIN
EDWIN L. KARPICK • M. T. BORGERHOFF

RESIDENT EDITORS

E. C. KREUTZBERG
Washington Editor

B. K. PRICE
Eastern Editor, New York

L. E. BROWNE
Associate Editor, New York, Boston

J. C. SULLIVAN
Pittsburgh Editor

A. H. ALLEN
Detroit Editor

E. F. ROSS
Chicago Engineering Editor

HOWARD C. TUTTLE
Chicago News and Market Editor

VINCENT DELPORT
European Editor, London

EDITORIAL CORRESPONDENTS

R. W. KINCEY, *Birmingham*
L. C. FELDMANN, *Buffalo*
SAMUEL S. CARR, *Cincinnati*
MAC L. HUTCHENS, *St. Louis*
GEORGE R. REISS, *Youngstown*
BERT D. LYNN, *Los Angeles*
ROBERT BOTTORFF, *San Francisco*
R. C. HILL, *Seattle*
C. K. CATES, *Dallas*
F. S. TOBIN, *Toronto*
J. A. HORTON, *Birmingham, Eng.*
LEON JAUDOIN, *Paris, France*
JACQUES FOULON, *Liege, Belgium*
HERBERT GROSS, *Dusseldorf, Germany*

MAIN OFFICE

Penton Building, Cleveland 13, Ohio
Main 8260

BRANCH OFFICES

New York 17.....16 East 43rd St.
Murray Hill 2-2581

Chicago 11.....520 North Michigan Ave.
Whitehall 4-1234

Pittsburgh 19.....2806 Koppers Bldg.
Atlantic 3211

Detroit 2.....6560 Cass Ave.
Madison 3024

Washington 4...1123 National Press Bldg.
Executive 6849

Los Angeles 28.....1452 N. Seward St.
Hudson 2-4376

London..2 Caxton St., Westminster, S.W.1

Business Staff on Page 4

NEXT WEEK . . .

Rubber Bonded to Metal Becoming a "Production Tool"

Efficient Handling Methods Can Cut Production Costs—III

Spectrographic Power Source Now Practical for Laboratories

Production of Metallurgical Coke—III

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 124, NO. 19 MAY 9, 1949

NEWS

★ As the Editor Views the News 47
★ News Summary 51
T-H Rules as Wage Drives Start 53
Expansion Unnecessary, U. S. Steel Chairman Says 54
Buyers Ask Firm Steel Prices 55
Kaiser Aluminum Plant Operations Being Adjusted 56
Geneva Freight Opposed 56
Raw Materials Limit Steel Capacity Hike 57
Discuss Nodular Cast Iron at Foundrymen's Meeting 59
Westinghouse Host to Tool Electrification Forum 60
Business Leveling Off, Purchasing Agents Say 77
★ Calendar of Meetings 77
★ Windows of Washington 78
Trade Winds Fair? Europe Tests Business at Exhibitions 81
★ Mirrors of Motordom 83
Koppers Acquires Freyn Engineering Co. 86
★ Briefs 87
★ The Business Trend 88
★ Men of Industry 90
★ Obituaries 93
★ Construction and Enterprise 175

SPECIAL REPORT

Motors, Machines, Men and Millions—The Story of Packard 61

TECHNICAL

★ Engineering News at a Glance 97
Indexing Fixtures, Automatic Cycling Cut Dynaflow Part Costs 98
★ Seen and Heard in the Machinery Field 102
How To Stock Motor Maintenance Parts 103
Efficient Handling Methods Can Cut Production Costs—II 105
High Strength Parts Made from Prealloyed Steel Powders 114
★ Progress in Steelmaking—Production of Metallurgical Coke—II 117
★ New Products and Equipment 137
★ Helpful Literature 149

MARKETS

★ Market Summary 151
★ Market Prices and Composites 152
Metals Output Drops as Prices Sag 156

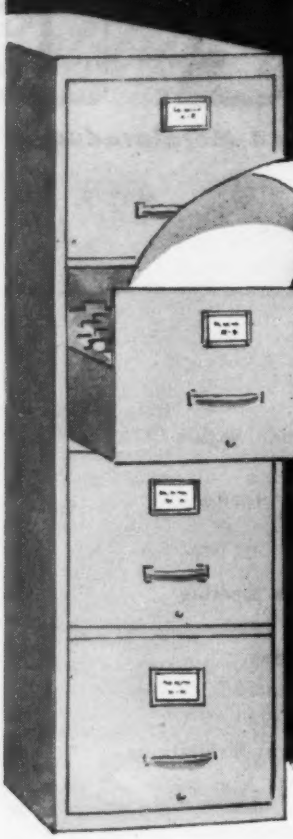
★ *Advertising Index* 182

Editorial Index available semiannually; STEEL also is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18

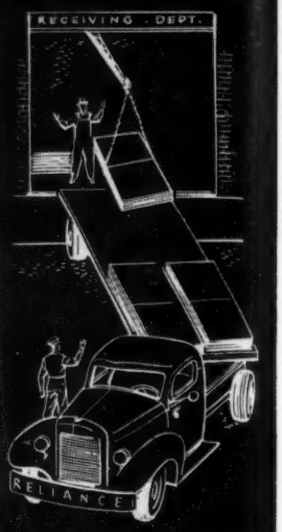
★ Denotes Regular Features.

UNIVERSITY OF MICHIGAN LIBRARIES

"RELIANCE OK"..P.A.



"On several occasions we would have had to discontinue operations were it not for the timely arrival of steel from Reliance."



Quotation Reproduced From A Letter in Our Files

Steel Plentiful or Scarce . . Reliance Service Clicks with Sheet and Strip Steel Buyers

DEPENDABLE DAN
OUR CUSTOMERS' MAN

Here is Reliance Service in action from the P. A's angle . . . in his own words.

"We feel we have been given a fair share of materials . . ." "Your steel is preferred by the men in our shop" . . . "Your service far above the average warehouse in this area" . . . "Your timely assistance kept our plants operating" . . . "You have been doing everything possible under present conditions" . . . "In a pinch we can depend on Reliance coming through" . . . "You have gone all-out" . . . "You helped us out of a bad situation." . . . etc. . . . etc.

Reliance is constantly planning and working toward greater production and supply . . . towards higher standards of steel service.

DETROIT STEEL CORPORATION

PRODUCERS OF
COLD ROLLED STRIP STEEL

DETROIT 9, MICHIGAN
NEW HAVEN 7, CONNECTICUT

RELIANCE STEEL DIVISION

PROCESSORS AND DISTRIBUTORS JOB-FITTED SHEET AND STRIP STEEL

General Office: 1025 South Oakwood Ave., Detroit 25, Mich.
Plants: Chicago, Cleveland, Detroit, New Haven
Sales Offices: Grand Rapids, Indianapolis, Lansing, Mich. New York, St. Louis, Toledo, Worcester

★ ★

Products: COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . . Slit or Round Edges . . . All Tempers . . . HOT ROLLED PICKLED STRIP STEEL—Cut Lengths . . . SHEETS—Hot Rolled . . . Hot Rolled Pickled . . . Cold Rolled . . . Long Terne . . . Galvanized.

May 9, 1949

Prices and Taxes

In the present business situation, price is the all-important factor. Many business analysts believe that a large part of the current sluggishness in buying is due to the fact that buyers are convinced that prices of most commodities will go lower. Consequently, they are limiting today's purchases to absolute necessities and are withholding ordering in normal volume until prices stabilize at still lower levels.

Most manufacturers agree that this diagnosis is accurate and are moving heaven and earth to reduce the selling prices of their products. They know that in a buyers' market one has to be efficient to survive. They also realize that there are some factors contributing to prices over which they have no control whatever. One of the most important of these is taxes.

For instance, millions of Americans think they should be able to buy a good automobile for $1000. Recently James D. Mooney, chairman of the board of Willys-Overland, told a New York audience that the much-wanted $1000 car could be built readily if it were not for the tax situation. The average car, he said, carries a direct and indirect tax burden of over $400. Against this handicap, all the efficiency the builder might muster cannot permit him to build a car to sell at $1000 and still cover labor, materials and dealers' margins.

Taxes constitute one of the largest elements in the price of every product of the metalworking industries, yet it is doubtful whether many buyers ever think of blaming the government for its share of responsibility for these high prices.

In fact, a relatively small portion of the American public has any conception of the extent to which taxes affect an individual or a corporation. Millions of employees think their employers pay them only the amounts they actually receive on payday. They ignore the amount withheld for taxes. Even more millions think the price they pay for food, clothing or household goods goes to the manufacturers and distributors. They do not realize that a substantial portion goes to the government.

If American citizens should suddenly assume toward federal taxes the attitude they now display toward prices, our nation soon would be operating on a sound basis.

* * *

MEN, MACHINES, MONEY: Fifty years ago two brothers with an idea each chipped in $3300 to start an automobile company. Another associate put in $3200 and two others paid in $100 apiece. The enterprise which grew out of this modest investment of $10,000 now is known as the Packard Motor Car Co.

In 16 pages in this issue, A. H. Allen, Detroit editor and author of the widely read "Mirrors of Motordom," traces the ups and downs of this proud company from 1899 to 1949. Few readers will be able to read this gripping story of success without realizing that it is an epic of the free enterprise system.

The story of Packard is one of great risks and compensating rewards. After reading it, one can easily understand why Packard is the only one of the builders of the 42 American automobiles exhibited at old Madison Square Garden in 1900 which remains in the passenger car business today.

Also, readers may well ask themselves these significant questions: Can anybody start an automobile manufacturing company on an initial investment of $10,000 today? To what extent

(OVER)

would today's governmental regulations hamper the birth and growth of an enterprise comparable to Packard? Is there in existence anywhere today—in communistic Russia, in socialistic Britain or elsewhere—any system under which the initiative, ability and resourcefulness displayed by Packard management would yield benefits to the public and to the nation comparable to those contributed by Packard?

We have a marvelous system. It should be retained and improved. —pp. 61-76

* * *

NODULAR IRON POPULAR: It is not surprising that the high light of the 53rd annual convention of the American Foundrymen's Society in St. Louis last week was a session devoted to a review of the development of nodular iron. Attesting to the interest of foundrymen in this subject is the fact that out of a total registration of 2500 for the entire convention, 800 attended the single session on nodular iron.

Significant points brought out in the discussion were that commercial production of the new iron in one foundry has mounted to as high as 50 tons daily and that according to present indications the new material is more likely to replace materials other than castings than to disturb existing markets for cast ferrous products.

Admittedly nodular iron is in the early stages of development and the patent situation is not clear, nevertheless a product which is superior to flake graphite irons in fatigue, hardness, strength, ductility and heat resistance seems destined to win an important place for itself. —p. 59

* * *

ECA BUSINESS EXPANDS: Apparently the European Recovery Program has been successful on at least two scores. It has built prestige for the nation in its cold war with Russia and has developed a substantial amount of business for American producers and manufacturers.

Commodity procurement authorizations by the Economic Co-operation Administration from April, 1948, through March, 1949, in millions of dollars were 2,821.5 to the United States, 699 to Canada, 442 to Latin America, 188.4 to other participating countries and 208.4 to other countries, or a total of 4,359.3. The authorizations to Canada, Latin America and other foreign countries gave these countries dollars, some of which are spent in the United States. Therefore the actual business created for American companies exceeds the direct authorization of $2.8 billion by a substantial amount.

Procurement will be higher in the next fiscal year of ECA. Administrator Paul Hoffman estimates procurement of American machinery and equipment in the second year will be $650 million compared with $401.1 million in the first year. —p. 78

* * *

WEAKENS UNION'S CASE: It is too early to judge to what extent, if any, forthcoming negotiations over union demands for wage increases and social security provisions will lead to work stoppages. However, if the situation at the Ford River Rouge plant last week were to be repeated frequently throughout industries in which negotiations are scheduled at early dates, the bargaining status of the unions would be weakened appreciably.

In the Ford case the employees went out on rather short notice because of alleged "speed up" tactics. It looks very much like a leftish-inspired act. It is difficult to see how the union, after this action—whether it was authorized or unauthorized—can come to the bargaining table later on with a good case on more important issues. —p. 53

* * *

PROBLEM OF SERVICING: Machine Tool Editor Guy Hubbard points out that certain aspects of the problem of servicing machine tools have changed radically during the past few decades.

At one time most machine tool builders made almost every part of their machines in their own shops. Today the builders purchase bearings, heat treated alloy gears, hydraulic feed systems, electrical drive and control apparatus, clutches, automatic lubricating systems, coolant systems and numerous other items from outside specialty manufacturers and incorporate these purchased parts and accessories into the machine.

Obviously the job of servicing a machine tool is greatly complicated by the fact that essential elements of the machine are designed and manufactured by several companies, instead of by the builder alone. The question arises as to how and to what extent suppliers of electrical, hydraulic and other equipment can assist machine tool builders in their servicing problems. —p. 102

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

EMPTY VICTORY—Labor union leaders are wondering just what they won at the polls last November. After four months, the administration has failed to deliver a Taft-Hartley repealer, as promised, and apparently has slight chance of producing a pro-labor law (p. 53). Meanwhile, the major unions are launching their fourth round drives for insurance, pension and wage concessions under the present law. T-H requirements for non-Communist affidavits could be embarrassing to the electrical workers and the steelworkers. Ban of closed shop agreements may affect the coal miners, maritime workers and printers.

FIRM PRICES?— Some steel buyers, particularly those bidding for public works contracts, are asking that steel companies quote firm prices, rather than prices at time of delivery (p. 55). Even though most buyers believe the next move in steel prices will be downward, they are arguing for the prewar basis of quoting, on the ground that firm prices enable them to estimate costs more accurately, and permit them to offer firm prices to their customers. To date, steel sellers have given no indication they will return to the prewar basis.

AID ASSURED— After congressional hearings on the amount of aid to be voted for European recovery have run their course, Congress will appropriate substantially what the administration has recommended (p. 78). Most legislators believe assistance to Western Europe is paying off in terms of building prestige for the United States, as against Russia, in the cold war, and that this country is getting something back on its investment in the form of improved trade.

FOREIGN FAIRS— Western European countries are testing the trade winds by industrial fairs and expositions (p. 81). Italy's fair has established a new record for size and attendance. The Paris Air Show emphasized the potentialities of commercial aviation. Britain's industries fair emphasizes that country's bid for a larger export market.

TOOL, DIE BUSINESS SLOW— Doldrums continue in the tool and die business, especially for those shops serving the automotive trade (p. 83). Studebaker and Nash have released some work for new models, but other major builders are not in the market. Some tool and die trade leaders yearn for a return to annual models.

HOW MUCH CAPACITY—Advocates of large-scale steel capacity expansion had their knuckles rapped by several industrial leaders last week. Chairman Irving S. Olds of U. S. Steel told stockholders that steel supply is rapidly catching up with demand and that no need for extraordinary steel expansion exists (p. 54). Even if 10 or 15 million tons of new capacity could be achieved by waving a wand, available raw materials would be inadequate to operate it, S. J. Cort of Bethlehem told the Iron & Steel Engineers at Baltimore (p. 57).

HERE AND THERE IN INDUSTRY—Koppers Co. Inc. is acquiring Freyn Engineering Co. through an exchange of stock (p. 86) . . . Continental Foundry & Machine Co. has bought the war-built steel foundry adjacent to its plant from WAA (p. 86) . . . An aluminum piano (p.87) is being built by Key Action Corp. in Los Angeles . . . Dodge has launched production of its new shorter wheelbase car (p. 84) . . . More than a billion and a quarter will be spent for highway construction in 1949 (p. 80) . . . Motch & Merryweather has opened a new $1 million plant (p. 60) for reconditioning machinery at Cleveland . . . Westinghouse Electric Corp.'s machine tool electrification forum, now in its 13th year, to a large extent has become the machine tool industry's own forum (p. 60) . . . Unemployment (p. 54) dipped in April, but the gain in employment was less than anticipated . . . Hidden payroll costs now amount to more than 15 per cent of industry's payroll (p. 54) . . . Volume of freight carried this year will determine (p. 56) whether the railroads will ask for another round of freight rate increases to offset costs of the 40-hour workweek beginning next September.

Engineering News, p. 97 *Market Summary, p. 151*

buying alloys?

only at Ryerson do you get these three:

1 *Stocks of selected quality*

2 *Test-proven performance*

3 *A guide to heat treatment*

...yet Ryerson gives you this three-way guarantee of satisfaction at no additional cost. So contact the Ryerson plant nearest you for any alloy steel requirement.

OTHER RYERSON PRODUCTS

Bars—Stainless, hot rolled and cold finished carbon steel, reinforcing

Structurals—I Beams, H Beams, channels, angles, etc.

Plates—Sheared and U. M., Inland 4-Way Floor Plate

Sheets—Hot and cold rolled, many types and coatings

Tubing—Seamless and welded mechanical and boiler tubes

Stainless—Allegheny metal bars, sheets, plates, tubes, etc.

Machinery & Tools—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK, BOSTON, PHILADELPHIA, DETROIT, CINCINNATI, CLEVELAND, PITTSBURGH, BUFFALO, CHICAGO, MILWAUKEE, ST. LOUIS, LOS ANGELES, SAN FRANCISCO.

STEEL
A PENTON PUBLICATION

T-H Rules as Wage Drives Start

Labor and administration fail in attempt to obtain new labor law to cover 1949 contract negotiations. Major unions to demand insurance, pensions and wage concessions

LABOR'S "victory" in last November's elections is beginning to look pretty empty to union leaders who now face the prospect of negotiating 1949 wage contracts under the provisions of the Taft-Hartley act.

Chances for a new labor-management relations act, at least in time to govern this year's contract negotiations, faded last week when the House failed to pass modifying legislation. The Wood bill, containing many of the major provisions of the T-H act and offered as a compromise after administration leaders had failed to obtain sufficient support for measures more favorable to labor, has been recommitted to the House labor committee.

Weeks will be required to report out a new bill. And there is no indication that the House will support a strongly pro-labor bill then.

Meanwhile, the Senate is bogged down in appropriation bills and other legislation and early action by the upper body is not in prospect.

T-H Repeal Unlikely—After last week's developments, legislative observers believe that if any new labor legislation is passed at this session of Congress, it will contain many of the provisions of T-H.

Failure of labor leaders and the administration to obtain more liberal legislation may affect approaching contract negotiations profoundly. Union leaders who have refused to sign non-Communist affidavits, including officials of the steelworkers and electrical workers unions, may be embarrassed if the companies are reluctant to bargain with them. Closed shop provisions, insisted upon by John L. Lewis' miners, the maritime workers and typographical unions, will continue illegal.

Wage Drive Starting—Meanwhile the unions are getting set for their fourth round drive for wage increases, social insurance and pensions.

United Steelworkers last week formulated demands to be presented to 835 producing units in the basic steel industry. The union also will start negotiations with 11,222 fabricating units within the next three months. A comprehensive insurance program, $150 a month pensions at age 65, and a wage increase are included in the union's asking demands. Although basic steel contracts exclude pensions as a topic for bargaining this year, the union will attempt to inject this matter into discussions. They will argue that industry should provide for depreciation of men just as it provides for depreciation of machines. Profit showing of the industry in 1948 and the first quarter of 1949 will be big talking points.

UE Demands—The electrical workers are asking for a $500 a year package, to be divided among insurance and pension improvements and wage increases. Local unions will decide on the allocation of demands.

United Automobile Workers-CIO has served notice on Ford and asked that negotiations start next week. Social insurance, $100 a month pensions at age 60, and a wage increase to bring purchasing power of wages to the June, 1946, level are being asked.

John L. Lewis and his United Mine Workers will meet with southern coal operators to discuss a new contract. Although demands have not been announced, they are understood to include a 20-cent increase in the tonnage royalty for the miners welfare fund and a shorter work-week.

Unrest Gains—The customary labor unrest which precedes the negotiation of new contracts is in evidence. Numerous grievance strikes have been called and some work stoppages have resulted from wage disputes.

62,000 Strike at Ford

WALKOUT by more than 62,000 workers at Ford's Rouge and Lincoln plants last Thursday threatened to upset plans by top union officials to launch a pension-insurance-wage drive against Ford on May 16.

Last week's walkout resulted from an alleged speedup grievance. It was the first major dispute at Ford since 1941 and the first mass walkout since the General Motors strike in 1946.

The why of the strike remains a mystery. Obviously, Ford will not enter into wage-welfare negotiations while its plants are strikebound. Further, the union appears to be wasting its ammunition by pulling a pre-

Pickets mass in front of main office of Philco Corp. in Philadelphia after 6500 workers left their jobs in a wage dispute. Office workers on the left tried to get through the lines but failed to do so. The office workers later were instructed by the company to go home. NEA photo

mature strike over a relatively trivial issue. Workers are not likely to consent to strike again in July if a satisfactory agreement on wages and welfare benefits is not reached.

Most obvious explanation is union politics, centering around a core of troublemakers continually on the muscle to show that they, and not their elected officers, are running the local. Unfortunately, the local officers and those of the UAW international have been forced to go along for the sake of union unity.

Court Upholds State Powers

STATE labor boards can regulate activities of unions so long as national labor relations legislation does not protect the union's act. This was reaffirmed by the Supreme Court last week when it refused to reconsider an earlier decision upholding the authority of the Wisconsin employment relations board to enjoin the United Automobile Workers-AFL from staging intermittent work stoppages at the Briggs & Stratton plant in Milwaukee.

Employment Gains Slightly

UNEMPLOYMENT dropped 151,000 while employment rose 172,000 in April. This was the second straight month in which improvement was noted in the labor situation, but the increase in jobs was below seasonal expectations. The entire April increase was due to expansion of farm work.

"Hidden Payroll" Growing

HIDDEN payroll costs, now estimated at more than 15 per cent of industry's total payrolls, may expand sharply as result of the unions' drive for social insurance and pension benefits.

A survey just completed by the research department of the Chamber of Commerce of the United States indicates that non-wage costs of private employers average 20.5 cents an hour.

Largest single item is payments for time not worked. These are equivalent to about 5 per cent of payroll and include paid vacations, bonuses in lieu of vacations, payments for holidays not worked.

Second major category consists of the employer's share of pensions, insurance and like agreed upon payments.

Legally required payments, such as old age insurance, unemployment compensation insurance, and workmen's compensation, are equivalent to about 3.2 per cent of the wage bill.

Woman stockholder gets an answer across the board from Chairman Irving S. Olds of U. S. Steel at the corporation's 48th annual meeting. Following the three-hour session, the usual lunch of sandwiches, pie and coffee was served to the 350 stockholders present

Expansion Unnecessary

U. S. Steel chairman says approaching supply-demand balance eliminates new plant need

ADMINISTRATION proposals for raising the country's steel capacity by 10 to 15 million tons came under attack last week at the annual meeting of the United States Steel Corp. Chairman Irving S. Olds pointed out that steel supply and demand are coming into balance, that premium prices virtually have disappeared, that the gray market has dried up, that little is heard of conversion deals, and that the voluntary allocations program has been reduced.

The proposals of the expansionists, he said, are unrelated to present conditions and are not needed. He doubted that any such plans could be carried out in time to be a factor in satisfying "what now remains of the former accumulated demand for steel products."

Split Stock — Shareholders approved a proposal for a three-for-one split of common stock. Preferred stockholders will be given three votes per share to maintain the present balance of voting power.

Arthur M. Anderson, chairman of the executive committee, J. P. Morgan & Co. Inc., James B. Black, president, Pacific Gas & Electric Co., Cason J. Calloway, Walter S. Gifford, chairman, American Telephone & Telegraph Co., and Alexander C. Nagle, First National Bank of the City of New York, were re-elected to the directorate for three-year terms.

Record Attendance — More than 350 stockholders, the largest crowd in the corporation's history attended the session, which was enlivened by discussion from the floor.

A flurry of excitement was caused by Mrs. Wilma Soss, representing the Federation of Women Shareholders in American Business Inc., who proposed the annual meeting place be changed from Hoboken, N. J., to New York. Mrs. Soss was dressed in a Gibson girl costume to match, as she put it, U. S. Steel's stockholders relations. Mrs. Soss' proposal was voted down, but she was for a time the principal attraction, particularly of the photographers. One stockholder promised to support her proposal if she would wear a bathing suit next time.

Another resolution called upon the directors to make a study of compensation of its executives through a stock purchase plan. The sponsor, L. Grosse, a New York accountant, argued that remuneration and stock interest of U. S. Steel junior executives should be adequate to prevent other companies from luring them away by offers of higher pay. The resolution was voted down, al-

though it was favored by at least two directors.

"Looking for Orders"

STEEL supply has reached a point where it is meeting demand and we are looking for steel orders, but we are getting a lot of them. This was the appraisal given by E. G. Grace, chairman, Bethlehem Steel Corp., at company's quarterly meeting.

Mr. Grace said Bethlehem will have capacity production through second quarter. Although cancellations have been numerous, the company has been able to fill all the gaps. He refused to make a forecast for steel industry operations for the second half, but said he is not as pessimistic as some other steel industry spokesmen.

Railroad and oil industry demand is off definitely, and no early upturn is in sight. Private construction still is on the decline, although public work is increasing. Auto demand continues high. The decline in consumer durables has about leveled off, believes Mr. Grace. Warehouses are rounding out their stocks and more export business is in sight.

Prices—No weakening in general base prices was predicted. The Bethlehem chairman pointed out that there are various cost factors which are continuing upward.

Predicts Continued Prosperity

IN SPITE of a decline in general business activity this year, there are indications total volume of the nation's business for 1949 may not be too far below the peacetime record of 1948, G. A. Price, president, Westinghouse Electric Corp., told stockholders at their recent annual meeting.

Although demand for heavy machinery and equipment has tapered off, "there are reasons to expect the market for capital goods to hold this year at a physical volume about double the average for the years 1935 through 1939, while production this year should be at least double the 1935-1939 average," he said. "Even this lower level of operations provides a solid base for continued prosperity."

Armco Plans New Blast Furnace

FIRST disclosure of plans for added steelmaking facilities for Armco Steel Corp. was made by W. W. Sebald, president, at a Founder's Day program.

A blast furnace, open hearths, and coke ovens will be located in Middletown, O., on a site already held by the corporation.

Buyers Ask Firm Prices

Contend escalator clauses cause hesitancy in placing of new business

QUICKENING trend toward a buyers' market is focussing increased attention on the possibility of firm quarterly quotations for steel prices, such as prevailed before the war.

Although most steel buyers believe that the next move in steel prices will be downward, many are asking that "price at time of shipment" clauses be eliminated from the terms of sale. Contractors bidding for public works jobs especially desire a return to firm price quotations.

Current bulletin of the National Association of Purchasing Agents supports this view and says that elimination of price at time of shipment from the terms of sale of the steel industry "is an essential step for the restoration of confidence on the part of business men in general." The bulletin points out that fabricators hesitate to quote firm prices in their contracts as long as steel is sold on an escalator basis. This in turn causes hesitancy on the part of their customers to place orders.

Suggest Prewar Basis—"Before the days of OPA the steel industry regularly protected its customers against a decline in price," says the bulletin. It was customary to make quarterly requirement contracts or specific project contracts at the going price at the time the contract was made, but both parties to such contracts regularly understood that in the event of a price decline before shipment the lower price would apply when the steel was shipped and billed. The buyer was, however, assured that he would not pay any more than the price on the contract or order at the time it was placed."

Insistence of buyers on firm price quotations probably would be more pronounced if they did not anticipate that steel prices will trend downward in the future.

Sellers Silent—Steel mills, however, have given no indications they plan an early return to firm price quotations. Pending negotiations on fourth round labor demands, future cost factors cannot be gaged accurately. Further, the matter of freight absorption still is hanging in the air, with the split decision of the Supreme Court in the rigid steel conduit case only prolonging the uncertainty.

In fabricated structural contracts, the trend already is toward firm prices.

Copperweld Seeks New Outlets

COPPERWELD Steel Co.'s Steel Division, Warren, O., is concentrating sales and production efforts on alloy and special quality carbon steels, including forging quality ingots, blooms and billets and bars.

During the recent period of record-breaking peacetime demand for steel, the plant had been devoted primarily to conversion of scrap by the electric furnace method into carbon steel ingots. With but little conversion steel demand left, Copperweld is now seeking other outlets for its capacity. Now only three of its furnaces are operating.

To engage more extensively in the finished steel business, the company will make some minor revisions and improvements at its Warren plant. The plant's electric furnace ingot capacity is 554,400 net tons annually. Its rolling mill annual capacities are: Blooming and billet, 300,000 net tons; and bar, 312,000 net tons. In addition there are facilities for cold finishing 50,140 net tons of bars annually.

More Furnaces Closed Down

TWO additional open-hearth furnaces have been closed and 700 more workers furloughed by Allegheny Ludlum Steel Corp. Four open hearths at the company's Brackenridge, Pa., plant have now been idled due to a decline in orders for silicon steel. About 500 additional employees have been laid off at Brackenridge raising the total of layoffs at that plant to approximately 1200. Two hundred more employees have been furloughed at the West Leechburg plant where about 275 previously were laid off.

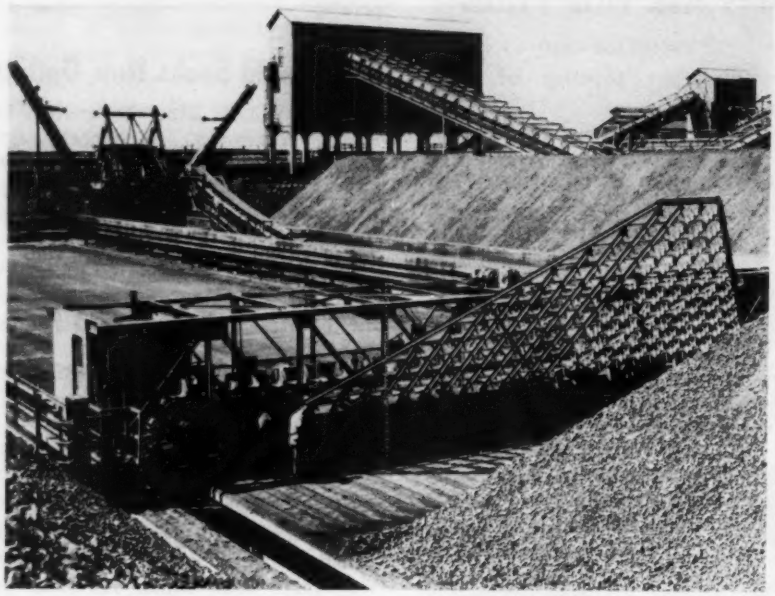
Decline Slight in Cleveland

SLOWLY declining rate of industrial production throughout greater Cleveland continued during April when total employment of 100 companies covered by the monthly survey of the Cleveland Chamber of Commerce declined 1.8 per cent.

The outlook for May is for no great change. To offset the 11 plants which fear further layoffs, 8 expect increases and 45 will operate without change. The average hiring rate for unskilled labor remains at $1.098.

May Reduce Iron Allocations

PIG IRON allocations may be reduced shortly from the present total of 88,000 tons a month. Letters to beneficiaries of the programs have



SLICING ORE: A jiggling harrow cuts a giant crosswise slice from the end of an iron ore stack at Geneva Steel Co., Geneva, Utah, intermountain subsidiary of U. S. Steel Corp. Each slice contains a part of every layer previously stacked lengthwise by twin mechanical boom (left background), thus blending the ore to make it more uniform for charging into blast furnace

been sent out by the Office of Industry Cooperation giving them until May 14 to signify whether they need a continuance of allocations.

Kaiser Aluminum Plant

Operations being adjusted. Trentwood activity curtailed but Newark works nears production

PRIMARY aluminum production is being reduced by the Permanente Metals Corp., Henry J. Kaiser's aluminum subsidiary, but at the same time it is stepping up operations at new finishing mills.

At Trentwood, Wash., the company early this month will curtail operations in various departments, reflecting lowered demand. However, at Newark, O., it plans to start operation of its new rod, bar, wire and cable mill in June. Production of steel reinforced electrical conductor cable will be started in third quarter. By fourth quarter production is expected to reach 15 million lb for the three months and it will be increased further thereafter.

Former Government Plant — The Newark plant, which will receive ingots from the Trentwood works, was purchased from the government and originally cost $23 million. An additional $4 million are being spent for the wire drawing equipment.

Training operations also are reported under way at Permanente's new aluminum foil mill south of San Francisco. During the war this plant produced magnesium but since then it has been unused. The foil equipment now installed was purchased in Germany under the reparations agreement.

Present operations are on a one-shift basis, using about 45 workmen. When the plant reaches full operations, some 200 will be employed. During April production of foil totaled about 20,000 lb, but full scale operations will give the plant productive capacity of some 750,000 lb monthly. Capacity operations will not be attained until late this year.

Plans Sales Program — The new plant is the only one of its kind west of the Mississippi river and is designed to serve western needs. However, the West Coast provides only 4 per cent of the nation's foil market and Permanente is embarking on a national sales program. The foil mill will use 90-ft coils of .026-in. thick aluminum sheets rolled at Trentwood.

Freight Rate Briefs Filed

VOLUME of freight carried this year will determine whether it will be necessary for the railroads to ask the Interstate Commerce Commission for another round of freight rate increases to offset the 40-hour workweek beginning next September, it was disclosed last week in briefs filed by the roads in connection with their application for a 13 per cent general rate boost.

About 5½ per cent of the 13 per cent increase already is in effect on a temporary basis pending the ICC's final decision.

In their brief the railroads said the 40-hour week has lowered by a substantial margin the net earnings estimated for 1949. Nevertheless, the carriers are standing on their freight rate application hoping to avoid asking for an additional increase. The brief did not state how far traffic could fall before higher rates would be sought. For the first 16 weeks of this year carloadings have been 7.4 per cent lower than in the like 1948 period and off 13.9 per cent from the comparable 1947 period.

Geneva Freight Opposed

Interstate Commerce Commission hears arguments in fight on reduced rates to West Coast

ARGUMENTS were heard by the Interstate Commerce Commission last week in the 2-year fight over railroad freight rates on iron and steel shipped from Geneva, Utah, to the West Coast.

Various steelmakers are opposing reduced rates put into effect for the transport of steel products produced by the Geneva Steel Co., U. S. Steel subsidiary.

The Geneva plant, built for the government during the war, was acquired by U. S. Steel and the lower freight rates to the coast were effected Apr. 1, 1947.

Opponents of the lower rates include the Kaiser Co., Armco Steel Corp., Sheffield Steel Corp. and Bethlehem Steel Co. All of them contend that the Geneva rates set by six western railroads discriminate against them since they are unreasonably low as related to competitive coal and iron ore rates from Utah to the West Coast.

New Traffic—John E. Hennessy, arguing in behalf of the six railroads, said that the Geneva rates have meant new traffic for the railroads. Before they went into effect, he declared, iron and steel didn't move to the West by rail.

The Geneva rates were set at 48 cents to 54 cents per 100 pounds in 1947 and have since risen to from 58 to 65 cents as a result of general freight rate increases. Steel company opponents of the rates maintain this is a disparity of 26 cents per 100 pounds under the existing rate structure.

Raw Materials Limit Steel Capacity Hike

Bethlehem official at steel engineers' rolling mill conference in Baltimore points out that raw material supply could not support additional 10 million tons of furnace capacity

CURRENT raw materials situation is one of the most important factors the steel industry must consider in its ever increasing struggle for more production.

This fact was brought out by S. J. Cort, vice president, Bethlehem Steel Co., addressing 800 iron and steel operating officials and engineers attending the annual spring conference sponsored by the Rolling Mill Committee, Association of Iron & Steel Engineers, at the Lord Baltimore Hotel, Baltimore, May 2 and 3.

The speaker pointed out that if someone could wave a wand and add 10 million more tons of furnace capacity to the industry, there just wouldn't be the necessary raw materials to support it.

Ore Supply Problem — Supply of iron ore is going to be a main problem from here on, he said. Certain authorities have predicted in the near future present source of high grade ore will be a thing of the past. Whatever the period, he declared, low cost, high grade ore will progressively become less and less available and the industry might as well face that fact as one of its big production challenges.

Beneficiation plants are one answer, at a price, he said. Another factor to consider is that foreign countries are becoming very nationalistic and are evaluating their natural resources at a much higher figure than formerly. From now on the nation's ores are going to have to be beneficiated or hauled a great distance. This will increase the pressure for trying to find more economical means of processing in the plant.

Coal Supply — According to the speaker, a somewhat similar condition has developed in respect to the nation's coal supply, as much of the good high volatile coal in this country has been, or is being, exhausted rapidly.

A somewhat more optimistic outlook may be seen in the availability of scrap. Today the situation has improved as battlefield scrap is beginning to come back to this country from Europe and the Orient. Obsolete ships and other equipment are becoming available for scrap and the mills are again getting back the normal percentage of scrap from the manufacturers who process steel.

At the end of World War I capacity of the steel industry was 57 million net tons of steel annually. Today the rate of capacity is 96 million net tons annually, Mr. Cort said. A large majority of that gain was obtained by building new blast furnaces and open hearths, but he said it must not be minimized that a great many technical improvements were made in existing blast furnaces and open hearths which materially raised production.

Capacity Rating Method—In answer to the question whether or not present capacity figures reflect actual productibility of the various steel plants, Mr. Cort commented that today's capacity rating method is being studied by the industry, but in his opinion the present capacity estimates are conservative.

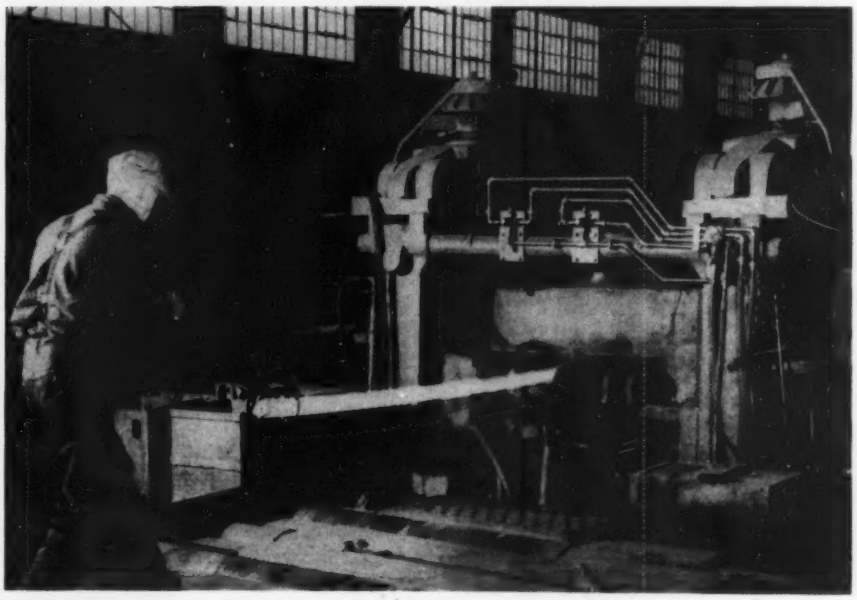
In actual practice many plants have been running in excess of rate of capacity for a considerable period. It is the custom in rating a capacity to allow 12½ per cent for downtime for repairs and miscellaneous delay. However, in actual practice during the war years, this figure has been nearer 6 per cent.

To offset present high cost of construction, production of pig iron has been increased by enlarging the hearths of existing blast furnaces by the use of carbon brick in place of refractory brick with the resultant gain of from 15 to 21 inches in hearth dimension; also further preparation of the raw materials going into the furnace.

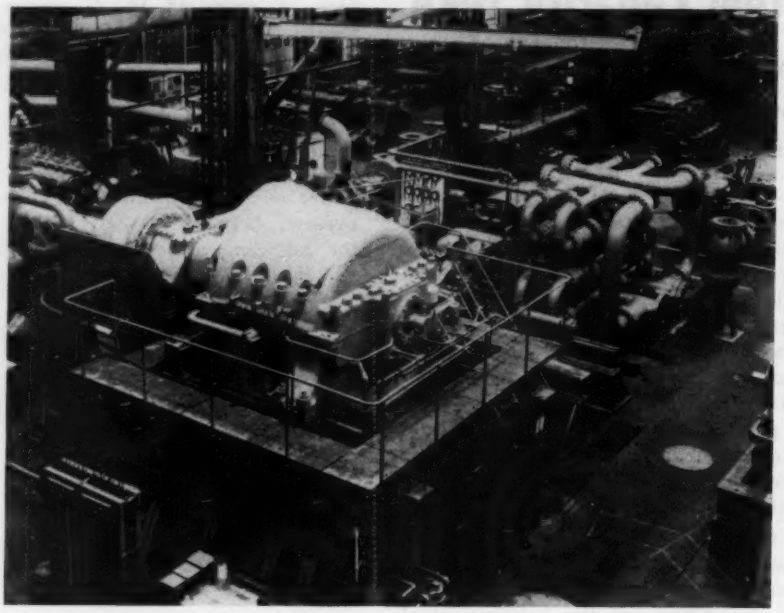
Output Increased — Production from open-hearth furnaces in a great many older plants has been materially increased by enlarging the size of present hearths, larger ladles and the addition of heavier ladle cranes to handle the larger heats.

The speaker also brought out the fact that a great many claims have been made as to the ability to increase steel capacity by using oxygen to improve combustion, but to date the balance between more rapid melting and loss of time due to extra wear of refractories has not been determined. Research on the use of oxygen is continuing throughout the industry. Whatever the result may prove to be from these oxygen experiments, the effort is worth making for it is a logical element in the many approaches which are being made to try to obtain increased production and effect economy.

Continuous Casting—The continuous casting process is still in the experimental stage, according to the speaker. If it works out successfully for certain applications, it still will affect only a very small section of the nation's production process. This process and others have been referred to by optimists outside the industry as though they would greatly reduce the necessary investment in a new plant. Operators who deal at first hand with production know that it is not the case as far as the bulk of the production process is con-



New rod mill for rolling stainless steels at Rustless Division, Armco Steel Corp. View shows three-high breakdown mill seen at AISE plant visitation



UPS FUEL SUPPLY: Complete test facilities for testing centrifugal compressors and expanders in the Olean, N. Y., plant of Clark Bros. Co. Inc. are shown above. Currently the Clark company, one of the Dresser Industries group, is constructing a battery of compressors for the first Hydrocol process plant for making gasoline from natural gas at Brownsville, Tex. Process may mean an added 25 per cent to the motor fuel supply of America

cerned. Such economies as are effected, such improvements that come in being, in the main will be due to the accumulated value of many undramatic little things, each one little, but all highly important when added together, he said.

The morning of each day of the meeting was devoted to presentation of technical papers concerned with various operating problems encountered within the industry. In the afternoons inspection trips were made to the plant of the Rustless Iron & Steel Division, Armco Steel Corp. and the Sparrows Point plant of Bethlehem Steel Co.

License Zinc-Coating Process

ARMCO Steel Corp., Middletown, O., announced last week it will shortly make available to other steel producers under license arrangements its process for zinc-coating steel. W. W. Sebald, president, disclosed that the company's fourth unit for producing the specialty steel product would go into production May 9 at its East Works plant.

Depreciation Policies Studied

IT IS a very sound practice to base depreciation charges on activity or production, John B. Inglis, partner, Price, Waterhouse & Co., New York, said in his address presented at the conference of the Controllers Institute of America in Cleveland, May 2. Due to the increase of about 100 per cent in construction costs since 1938, there has been considerable debate whether reported earnings statements are realistic when depreciation charges are based on original cost.

In the steel industry, he said, for a great many years depreciation has been generally related to production. However, many steel executives have felt that their depreciation charges have been inadequate during recent years when their companies have spent large sums for new equipment while operating at an unusually high rate. Recalling the past when there were long periods of operations at a low rate, they feel that current depreciation charges should be increased on some reasonable basis. In adopting a policy of accelerated depreciation, several large steel producing companies have merely extended the policies they have followed over a long period of years.

Not Whole Solution—Acceleration of write-offs is sound as far as it goes, but it is a far cry from the whole solution to the problem of capital impairment, said H. T. McAnly, partner, Ernst & Ernst, Cleveland. What is needed, he said, is a recognition of the change in the purchasing power of all funds being recovered in depreciation. We need an index, he continued, "to measure the change in purchasing power of funds recovered through depreciation and a tax policy which takes this changed purchasing power into consideration. Basically, this could be attained by having a government agency publish an overall index covering the approximate changes in the purchasing power of the dollar during the past 40 or 50 years. This index could be used by all taxpayers to adjust the annual cost depreciation provision to determine an additional amount to be allowed as a tax deduction. This additional amount would represent a reserve to prevent capital impairment of a going concern and would not be credited as accrued depreciation against the cost of the assets. The index would be used to determine an adjustment of the dollar value of the acceptable quantity of depreciation for the year as expressed on a cost basis."

Sees Sounder Prosperity

PRICE shakeouts accompanying the current softening of business may bring a sounder prosperity by bringing more buyers into the market. This note of optimism was sounded by Earl O. Shreve, president of the Chamber of Commerce of the United States, and echoed by H. A. Bullis, chairman of General Mills Inc., at the opening of the chamber's 37th annual convention in Washington last week.

Farm Equipment Makers Gain

FARM equipment makers are well on the way toward another record year.

Most of the leading firms in the $2 billion industry had record breaking sales and earnings last year. Sales for many of them may reach a new peak in 1949.

International Harvester Co. thus far in its current fiscal year which started last Nov. 1 has produced at least 30 per cent more farm equipment than in the like period a year ago.

Deere & Co.'s November-January quarter sales were up 39 per cent. J. I. Case's sales for the same period showed a 48 per cent increase. Oliver Corp.'s sales for the five months ended Mar. 31 rose 13.8 per cent. Minneapolis-Moline Co. in the same period had a 16.8 per cent gain. Farm equipment sales of Allis-Chalmers Mfg. Co. rose 35 per cent in the first quarter of this year. Massey-Harris Co. states its business during the November-January period was "substantially higher" than a year ago.

Discuss Nodular Cast Iron

Keen interest shown in new development at annual meeting of foundrymen's society

INTENSE interest in development of spheroidal or nodular graphite cast iron was evidenced at the 53rd annual convention of the American Foundrymen's Society at St. Louis, May 2-5.

Devoted almost exclusively to technical discussions relating to modern foundry practice, the convention was highlighted by a session devoted to a review of developments in nodular iron which attracted an audience of over 800.

In his discussion of the subject, Don J. Reese, International Nickel Co., stated commercial production of what his company terms "ductile cast iron" has reached as high as 50 tons daily in the case of one foundry.

Other speakers on the subject were Gosta A. Vennerholm, Ford Motor Co., Charles K. Donoho, American Cast Iron Pipe Co., and Richard G. McElwee, Vanadium Corp. of America.

Market Significance—All speakers indicated the new material would be more likely to replace materials other than castings rather than disturb existing markets for cast ferrous products. It was also emphasized production practices will require close control and that much development work remains to be done.

The patent situation concerning nodular iron still is confused in that a number of applications have been made by various companies but none has been granted yet.

With total attendance of nearly 2500 large audiences marked all of the convention sessions.

Exchange Papers — Two foreign foundry associations presented exchange papers, the Institute of British Foundrymen sponsoring a paper on "Properties of Cast Iron in Relation to the Carbon Equivalent Value," and the Institute of Australian Foundrymen sponsoring one on "Graphitization of Gray Cast Iron by Heat Treatment."

Various St. Louis district foundries were open throughout the convention for inspection by delegates to the meeting. Seven foundrymen long prominent in the industry were honored at the annual banquet at which W. Stuart Symington, secretary of the Air Force, was chief speaker. Russel J. Anderson, Belle City Malleable Iron Co., Racine, Wis., S. C. Massari, technical director of the society, and Gosta Vennerholm, Ford Motor Co., received gold medals for their contributions to the industry. In addition the following were honored with honorary life memberships: Clement J. Freund, dean, College of Engineering, University of Detroit, Anthony Haswell, Dayton Malleable Iron Co., Dayton, O., Ralph. L. Lee, Grede Foundries Inc., Milwaukee, and William B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh.

EDWIN W. HORLEBEIN

At the annual business meeting May 4, Edwin W. Horlebein, president, Gibson & Kirk Co., Philadelphia, was elected president of the society for 1949-50 to succeed William B. Wallis. Walton L. Woody, vice president, National Malleable & Steel Castings Co., Cleveland, was elected vice president. The new executives take office following the annual meeting of the society's board of directors this summer.

Urges Foundries to Modernize

FACED with high production costs and with labor's growing dislike for arduous, unpleasant jobs, American foundries must mechanize and modernize in order to compete successfully with other metal working industries. This advice was given by Frank R. Elliot, foundry superintendent of Westinghouse Electric Corp.'s appliance plant at East Springfield, Mass., before the meeting of the American Society of Mechanical Engineers in New London, Conn., May 2.

Pointing out that handling and rehandling of materials constitutes 50 per cent of the cost of making small gray iron castings in the average production foundry, Mr. Elliot described many new techniques recently introduced for mechanizing foundry operations. Conveyorizing the Westinghouse foundry has eliminated the manual lifting of 22 tons a day by each molder, and at the same time has boosted each worker's productivity by more than 50 per cent.

Among the various labor and cost-saving techniques that some foundries have instituted recently are: Use of automatically controlled skip hoists in place of charging cranes; mechanical charging; storage of miscellaneous materials on pallets; gasoline-powered industrial trucks with scoops or forks; hand lift trucks; use of skids made of the ingot material for moving bundles of ingots; in the molding equipment, mechanical equipment for handling the pouring weights and jackets from mold to mold; conveyors for all stages in molding process; and mechanical sand handling equipment.

Ore Mining Company Gets Loan

A 4 MILLION dollar credit from Export-Import Bank has been granted Liberia Mining Co. Ltd. for financing development of high grade iron ore deposits at Bomi Hills, Liberia.

The loan is contingent upon carrying out of an agreement between the Liberia Mining Co. Ltd. and Republic Steel Corp., Cleveland, under which the latter will invest $3 million in the mining company and will execute a long-term ore purchase agreement for a portion of the annual production. Total capital cost of the project is expected to be around $8 million. Approximately $1 million has been expended by the mining company on development work. The project is to include the building of a 45-mile railroad from the port of Monrovia to Bomi Hills, and the construction of ore handling and storage facilities at the port.

The Bomi Hills iron ore deposits are estimated to contain more than 20 million tons of high-grade ore of more than 65 per cent iron. Large additional quantities of lower grade ore are also known to exist within the area. Ore deliveries are expected to begin in 1951.

Washer Sales Up in March

FACTORY sales of standard-size household washers in March totaled 254,300 units, off 37.7 per cent from sales of 408,512 units in March, 1948, according to the American Washer & Ironer Manufacturers Association. March sales were 21.9 per cent higher than in February when unit sales amounted to 208,500. Factory sales of ironers in March totaled 23,500, off 16.8 per cent from 28,500 units in February and a decrease of 56 per cent from 53,686 in March, 1948.

Tool Electrification

Forum at Buffalo attracts almost 300 representatives of industry. Many papers presented

FOR the thirteenth time since 1936, Westinghouse Electric Corp. provided facilities and entertainment during the annual Machine Tool Electrification Forum held at Buffalo, Apr. 26 and 27.

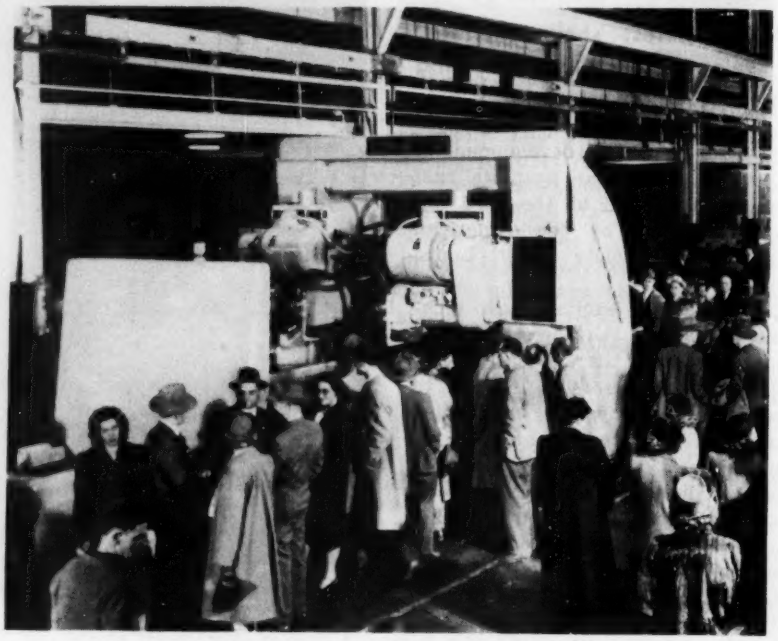
This event, which to a large extent is the machine tool industry's own forum and which has come to embrace many engineering subjects not purely electrical, was attended by 288 conferees. Of these 178 represented 108 machine tool manufacturers, 12 represented technical and business publications, 5 were representatives of the United States Navy and the balance were Westinghouse men—including its International and Canadian subsidiaries.

Presence of the Navy men can in part at least be accounted for by the similarity of electrical drive and control problems on machine tools and in certain apparatus on board ships —including gunfire control mechanisms.

Papers Presented—The first day's sessions, held at Hotel Statler, included papers on applications of magnetic clutches and brakes to turret lathes, by L. A. Liefer, electrical engineer, Gisholt Machine Co., Madison, Wis.; use of high frequency drives for "superspeed" grinding spindles, by Leroy B. Morrill, electrical engineer, Heald Machine Co., Worcester, Mass.; use of resistance wire strain gages in aligning machine tool slides and in measuring instruments; and simple applications of induction heating to hardening and tempering of drop hammer slides, etc., by R. L. Alcorn Jr., mechanical engineer, Chambersburg Engineering Co., Chambersburg, Pa., with D. G. Hatchard of Westinghouse collaborating.

The second day's sessions, held at the Buffalo-Westinghouse motor and control plant, included descriptions and demonstrations of new types of adjustable voltage variable speed drives; use of electrical braking of induction motors; control transformers for machine tool use. Following luncheon there was a tour of the plant including the copper wire drawing and coating division and the control section.

Berna Is Speaker—At the annual dinner, held at Hotel Statler, F. D. Weatherholt, assistant manager of industrial sales for Westinghouse, introduced Tell Berna, general manager, National Machine Tool Builders' Association, as guest speaker. Mr. Berna pounded home the fact that it is very easy to drain industry of its life's blood by excessive payments of earnings to workers and to the government—as is the tendency today.



NEW SURFACE GRINDER: Destined for England is this new Hydrail surface grinder produced by Thompson Grinder Co., Springfield, O. Machine weighs 65 tons. Several others are in production for domestic aircraft companies

Open Machine Rebuilding Plant

ENLARGING its facilities for rebuilding and reconditioning used machine tools, Motch & Merryweather Machinery Co., Cleveland, officially opened its new plant in Euclid, O., with a three-day open house May 3-5. Completed at a cost of $1 million the plant will house the firm's Used Machinery Division, headed by George E. Merryweather.

Plans call for the division to handle rebuilding and reconditioning of standard or single purpose machines in all sizes, although occasional special purpose machines will be accommodated. The plant covers 44,758 sq ft and is equipped with a 25-ton overhead crane which services its entire 300 ft length. Other handling equipment includes gantry cranes which travel the full length of the building and four reel-type jib cranes to aid in running-in of machines and small assembly work.

Erecting Foil Rolling Mill

ALUMINUM Foils Inc. has placed an order with Lewis Foundry & Machine Division, Blaw-Knox Co. for mill equipment for rolling aluminum foil in a new plant being erected at Jackson, Tenn. The contract represents investment of foreign capital in new enterprise within the United States.

Aluminum Foils is a wholly owned subsidiary of the Swiss Aluminum Co. (S. A. pour l'Industrie de l'Aluminium) of Lausanne, Switzerland. The Tennessee plant will be one of the most modern installations for rolling thin gauge aluminum foil.

The award to Blaw-Knox involves more than $1 million and covers several stands of 2-high and 4-high mills, as well as auxiliary rolling equipment.

Conveyor Plans Get Setback

PLANS to build a belt conveyor between Lake Erie and the Ohio river received at least a temporary setback last week when the House commerce and transportation committee of the Ohio legislature voted 12 to 4 to kill by indefinite postponement the bill which would have granted public utility status to the belt line. The much discussed project to supply iron ore and coal to steel mills and others in the Cleveland, Youngstown and Pittsburgh districts is headed by H. B. Stewart Jr., president of Riverlake Belt Conveyor Lines Inc., the company formed to build the giant conveyor.

STEEL
A PENTON PUBLICATION
May 9, 1949

MOTORS, MACHINES, MEN -and Millions

INTRODUCTORY

Detailed study of how a large manufacturing organization got that way—how it started, how it changed over the years, the dominant personalities who made its history, its physical concept today and where it appears to be heading for tomorrow—all combine to make a case history representative of a large section of U. S. industry in the twentieth century. The editors of STEEL have selected Packard Motor Car Co., Detroit, for such an analysis, the first of its kind ever attempted. The choice proved timely, for Parkard is now celebrating a Golden Anniversary and has just introduced new models, as well as an unique new automatic transmission, commemorating the event

THE FIRST PACKARD 1899

By A. H. ALLEN
Detroit Editor, STEEL

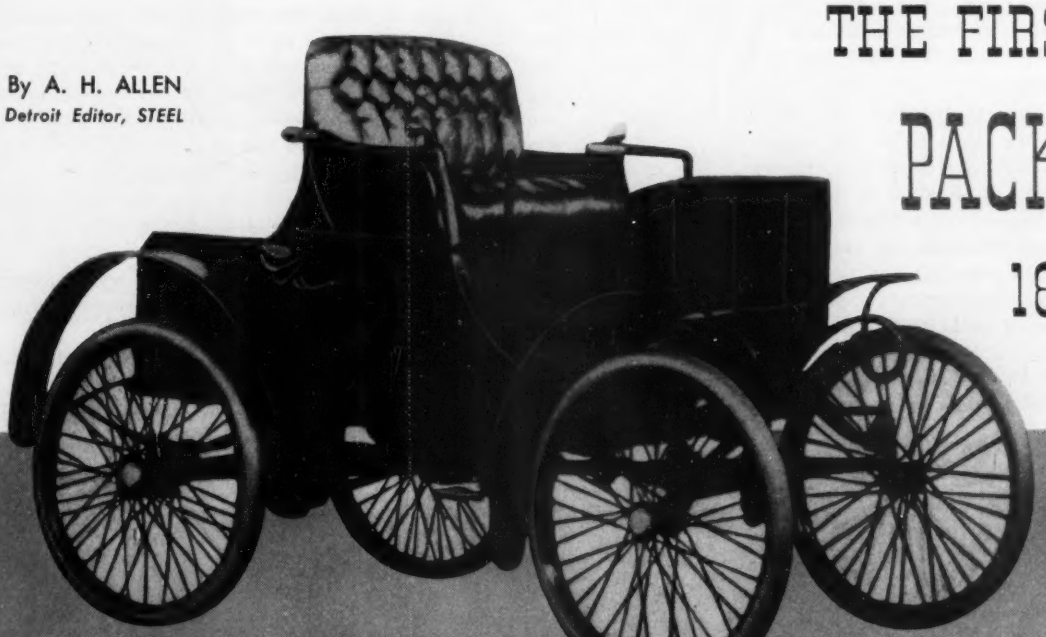
ON a bumpy dirt road which twisted over the 50 miles between Warren, O., and Cleveland back in the summer of 1898, James Ward Packard fussed and fumed over a cantankerous single-cylinder gasoline buggy he had just bought from Alexander Winton in Cleveland on Aug. 13.

He was no novice at these mechanical aberrations of the time, for with his brother, William Dowd Packard, he had been working up drawings for a "horseless carriage" in the office of his electrical equipment plant at Warren as early as 1893. The project was dropped when the industrial depression of '93 struck, but the idea remained fresh in the minds of J. W. and W. D.

Earlier in 1898, J. W. had been in Europe and purchased a three-wheeled French contraption called a De Dion-Bouton which he had been able to keep going for as far as half a mile without a stop. Later, when he heard about Winton's activity at Cleveland, he hurried up there to buy the twelfth buggy the mustachioed Forest City engineer had constructed.

Presents Ideas—The snorting Winton model finally arrived in Warren behind a team of horses, and owner J. W. Packard had dozens of ideas on how to make the vehicle a little more tractable. These he transmitted to Winton in short order. The Cleveland manufacturer was unimpressed and told Packard if he was so clever why did he not build his own version—to which Packard replied he guessed he would and stomped off to Warren. Meanwhile, however, he grabbed off George L. Weiss of Cleveland, one of the first organizers of Winton's company, and W. A. Hatcher, Winton's shop superintendent, to help him.

The three labored for many months, with the enthusiastic support of the other Packard brother, and on Nov. 6, 1899, the first Packard chugged along the quiet streets of Warren while small children hooted in derision and dogs and cats ran for cover. It was a single-seated buggy type with wire wheels. Steering was by tiller, with a 12-horsepower single-cylinder horizontal engine operating the rear axle through three-speed transmis-



sion and chain drive. The machine created a mild sensation in Warren and it was sold to George D. Kirkham for $1250 on Jan. 3, 1900, just four days after the partnership of Packard & Weiss had been organized. They started work immediately on a second car, a two-seater which was finished on May 21 and driven to Cleveland by way of Ashtabula, better than 100 miles, in the astonishing time of 8 hours and 55 minutes!

Succeeding test runs that summer, some at the breakneck speed of 22 miles an hour, proved the practicability of the vehicle and suggested numerous modifications. A standard accessory in those days was an ammonia squirt gun to ward off dogs who persisted in snapping at tires. In September of 1900, Packard and Weiss dissolved their partnership and drew up papers for the Ohio Automobile Co., incorporated as of Sept. 10 in the state of West Virginia. The company purchased some property from the Packard Electric Co., bought some machinery from the New York & Ohio Co. and took over all credits and obligations of Packard & Weiss.

Five Incorporators—Original capital stock authorized was $500,000 of which $100,000 was subscribed and $10,000 paid in by the five incorporators. The Packard brothers each subscribed $3300 for 33 shares, Weiss $3200, W. A. Hatcher $100 and a James P. Gilbert $100. J. W. was named president and general manager, Weiss vice president and W. D. secretary and treasurer, at a meeting on Oct. 24, 1900, the same day that a special Packard model with copper cylinder jacket was sold for $1750 to a W. D. Sargent of Chicago.

In those days, as the industrial revolution of the twentieth century was dawning, the automobile was little more than a hobby indulged in by wealthy sportsmen. Henry Ford had just begun to put together some cars at his Detroit Automobile Co. shops, although he had built his first gasoline buggy in 1893 while still working with the Edison Illuminating Co. of Detroit. William C. Durant, progenitor of what was later to become General Motors, had yet to come on the scene. Winton kept busy at Cleveland turning out cars and participating in cross-country races. Other engineers around the country were burning the midnight oil over drawings and pounding out parts in blacksmith and machine shops for gas buggies.

The marketplace for autos was New York city, and the first U. S. auto show was held there Nov. 5-10, 1900, where 42 American makes were wheeled around a circular track in Madison Square Garden. Of all the domestic exhibiting companies at that first show, only Packard remains in the passenger car business today. Three Packards were sold at the show, two to William Rockefeller, a brother of the late John D., and the third to Hollis Honeywell of Boston.

First Steering Wheel—In 1901, the Ohio Automobile Co. arranged for its cars to be displayed and sold in New York by the firm of Adams & McMurtry. The 1901 model was the first automobile in the country to have a steering wheel instead of a tiller. It was faster than its predecessors and Packard and Hatcher had developed a radius link which reduced the proclivity of cars for running into ditches and trying to climb telephone poles. Newspaper reports of early 1901 tell of Alden S. McMurtry being arrested in Warren for driving 40 miles an hour, as indeed he might be even today.

Henry Bourne Joy, one of three sons of a wealthy Michigan pioneer, James F. Joy, who left an estate of $2 million in railroad and bank securities at his death in 1896 after an illustrious career in law and politics, was having trouble with his motor boat engines in Detroit. He was a leader of the Michigan State Naval Brigade which had served in the Spanish-American war on the cruiser Yosemite and which included scions of the state's foremost families. A bank director, treasurer of a beet sugar refining company and president of the Detroit Athletic Club, young Joy had journeyed to New York to see if he could not find something new in the way of boat engines. While looking at engines with his brother-in-law Truman Newberry, another wealthy Detroit socialite, the two became interested in automobiles and happened to be standing in front of Adams & McMurtry wondering whether the two Packards at the curb would start.

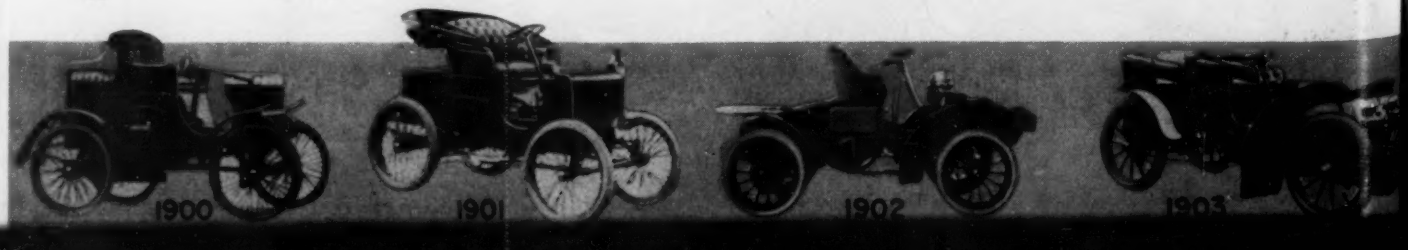
At that moment, a fire alarm sounded and a brigade of horse-drawn apparatus soon thundered down the street. In a twinkling, the owners of the Packards had rushed out of the building, spun the cranks of their engines and rolled off in pursuit of the fire engines. Joy and Newberry were amazed and directly paid $1200 cash for the only Packard available for sale in New York.

Profound Influences—The incident is repeated for it touched off profound influences on the future of the Ohio Automobile Co. and its successor, Packard Motor Car Co. Henry Joy was so enthused over his new Packard that he visited the factory at Warren and started discussions with J. W. and W. D. over the future of the business. Their thoughts ran in similar channels and they began mapping out plans to build 200 cars a year, following Joy's investment of $25,000 in the company. More capital and a larger plant were at once indicated.

Local bankers at Warren were not too enthusiastic over Packard's future prospects. Henry Wick, wealthy Youngstown industrialist, wanted to move the plant there. A Philadelphia newspaper publisher cited the benefits of location in the East. The Packard brothers leaned toward Cleveland and sounded out the chamber of commerce there. Col. J. J. Sullivan, head of the chamber, frowned on the idea, saying, according to the report, "We already have the Winton factory and besides we have just induced the largest clothespin manufacturer in the country to build a plant here."

Obtain More Capital—Henry Joy went back to Detroit and with the help of Newberry lined up a group of friends and relatives who subscribed $250,000 capital for Packard. On Oct. 2, 1902, directors of the Ohio Automobile Co. voted to change the name to Packard Motor Car Co. and to authorize the sale of 2500 shares of stock at $100 per share. Philip H. McMillan, son of a Michigan senator and a pioneer freight car builder, invested $50,000. Joy and Newberry each chipped in $25,000. John S. Newberry of the same family, Joseph Boyer, and Frederick M. and Russell A. Alger Jr., sons of a Michigan lumberman who was secretary of war under President McKinley, all came in for the same amount. Joy's brother Richard and C. A. DuCharme each contributed $10,000. Dexter M. Ferry Jr., of the famous seed-growing family, furnished $5000.

Original incorporators of the company had paid in $150,000 and thus, with the advent of new Detroit capital, saw control pass to the new interests. The Pack-



ard brothers and Weiss at the start controlled 78.2 per cent of the $150,000 investment; after the total was raised to $400,000, their interest dropped to 29.3 per cent, while the Detroit investors represented 62.5 per cent. (From report on Motor Vehicle Industry, by Federal Trade Commission, 1939; House Document No. 468; pp. 731 et seq.). The move to Detroit was under way.

Plant Site Acquired—A farm of 40 acres far from the center of Detroit, then a city of 285,000, was obtained for something less than $1000 per acre. Five acres were held sufficient for the proposed plant, with the other 35 acres to be held in reserve for possible later sale at a profit. The site on East Grand Boulevard is now deep within the confines of the city of Detroit, in the meantime having expanded to cover 89 acres. A promising young architect named Albert Kahn was commissioned to design the first plant building, which was completed before the end of 1903, and operations transferred from Warren, along with 247 or practically all the personnel there.

The Detroit plant built in 1903 is credited with being the first reinforced concrete manufacturing structure in the world.

J. W. Packard was an ardent devotee of the single-cylinder engine, on the premise that multiplying the cylinders meant only multiplying trouble. However, some time before the transfer to Detroit, he and Joy had met in New York's Bronx Park a Frenchman by the name of Charles Schmidt, superintendent of the Mors automobile plant there. He was hired to develop a four-cylinder engine for Packard and began his work in Warren on the 1903 model K, the first four-cylinder Packard and the last model to be built in Ohio. Despite a price tag of $7500, it was too complicated and too costly to build. Difficulties with defective materials and lack of sufficient inspection of parts in process were numerous.

New Financing—Prior to reorganization in 1909 under Michigan charter, there was a total of $525,000 cash paid into the company—$150,000 by the original Packard interests, $250,000 by the Detroit investors, and $125,000 by selected executives who were given stock options on three occasions, in 1906, 1907 and 1908. In 1903, about a year after the appearance of Detroit capital, stockholders recommended execution of a mortgage to secure an issue of five-year 5 per cent bonds in the amount of $250,000, proceeds of which were to be used in completing the Detroit plant and for working capital. A syndicate of stockholders, essentially the Detroit investors and J. W. Packard, proposed to purchase the entire issue of bonds on condition the company pay them $250,000 in treasury stock. This was approved and consummated, the syndicate thereby receiving a stock bonus equivalent to 62.5 per cent of the aggregate stock outstanding before the bonus.

Meanwhile stock dividends were paid on three occasions—50 per cent or $325,000 in 1906, 45 per cent or $450,000 in 1907 and 100 per cent or $1.5 million in 1908, the same dates on which stock options were offered to executives. Thus, in 1909, 74.6 per cent of the $3,050,000 in outstanding stock was accounted for by the issuance of stock dividends.

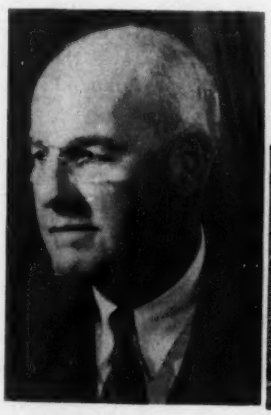
New Model—The Model L proved a great improvement over the Model K, which had resulted in a loss of $200,000. Stories are told of how E. F. Roberts, who

WILLIAM DOWD PACKARD

JAMES WARD PACKARD

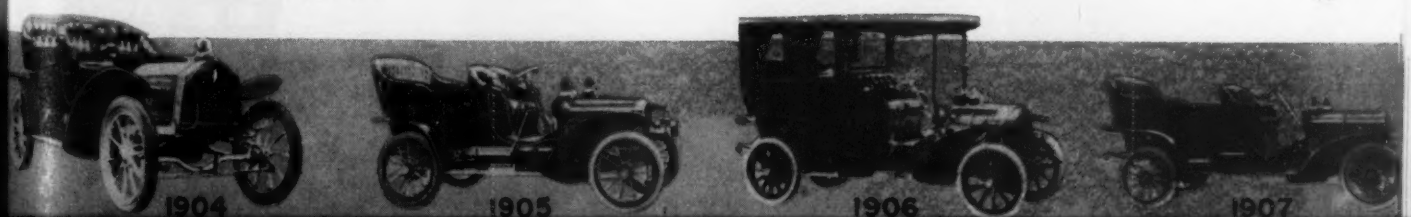
The two Warren, O., brothers who organized the company in 1899

Original plant in Warren, O., where the Packard brothers built their first car, at the same time operating a flourishing electrical fixture business



ALVAN T. MACAULEY

For 38 years a dominant figure in Packard history and the automotive industry. He retired last year



was to direct Packard's manufacturing for 30 years, worked without sleep for three days and nights to design a new carburetor. A rear axle transmission eliminated chains and sprockets. The traditional Packard radiator shell lines and the familiar hexagon hubcap originated with this model and have been carried through with modifications to this day. The hubcap was designed by Russell Huff, chief engineer, as a means of providing a grip for wrenches.

The loss incurred in 1903 moved one stockholder to complain, "If you lost $200,000 in building 200 cars, you'll lose $400,000 building 400 machines." His shares were bought up by the closely-knit group of Packard officials for 50 cents on the dollar. The $250,000 bond issue injected new life into the company and production rose to 481 in 1904. Col. Sidney D. Waldon, sales manager who had come from Warren, redoubled his advertising and promotion efforts, and in 1906 about 700 of the 24-horsepower Model S cars were sold at from $4000 to $5325.

In 1907 the company introduced the first Packard 30, so-called because of its horsepower. This $4200 job was heralded with a catalog so elaborately printed it cost $35 a copy to produce. Boxed in white and gold, it carried reproductions of several full-color paintings of the car in varied scenery, with each copy personally autographed by Joy. Packard profits hit $1 million for the first time that year.

Significant Turning Point—Aug. 31, 1909, was a significant turning point, for it was then the Packard company of West Virginia was dissolved and its assets assumed by the new Michigan corporation, each of the 69 stockholders receiving 1.6 shares of preferred and 1.6 shares of common stock in the new company for every single share of stock held in the West Virginia company. Thus the Packard Motor Car Co. (Michigan) held capital of $10 million, divided equally between preferred and common stock, Henry Joy was elected president at the first meeting of the new board held on Sept. 3, J. W. Packard becoming chairman of the board, Russel Alger vice president and vice chairman of the board, and Philip McMillan secretary-treasurer.

Sales held at around $15 million annually for the next six years until 1916 when Alvan Macauley took over the presidency and volume rose to better than $35 million. A 6-cylinder engine was introduced in 1911, and in 1915 the famous twin-six, engineered by the hard-driving Col. J. G. Vincent made its appearance. In 1916 over 10,000 of these engines were built and Packard sales spurted four-fold from the 2645 cars built in 1915. At this stage the company was content to move at a leisurely pace in the luxury field where customers were willing to pay $4000-$5000. The Model 30, a 4-cylinder type, was built with different refinements over a period of five years and in 1909 headlights and a cellular radiator were made standard equipment, to be followed shortly thereafter by the dry plate clutch and shock absorbers. In 1914 came the first electric starter.

Macauley Takes Over—Alvan Macauley had been general manager for six years prior to taking over as president in 1916 from Joy who wanted to devote more time to outside interests, particularly the Lincoln highway. Macauley and Joy were similar in many respects and were symbolic of the company's long and successful history in the production of a "gentleman's car, built by gentlemen." For 17 years Macauley served as president of the Automobile Manufacturers Association, continuing on in 1942 as head of its wartime counterpart, the Automotive Council for War Production. He held the presidency of Packard from 1916 to 1939, turning over the reins to Max Gilman at that time and becoming chairman of the board, from which post he retired only a year ago at the age of 76.

In the quarter-century following incorporation of the Michigan company, a fairly generous policy of dividend payment was pursued. Average yearly net profits after taxes ran around $5.5 million, out of which cash dividends averaging $3.75 yearly were paid. Surplus was reduced on four occasions prior to 1926 through payment of stock dividends totaling approximately $25 million. In 1920, par value of common stock was reduced from $100 to $10, with 10 new shares issued for each old share. Then, in 1929, the common was changed from $10 par to no-par, with stated value of $2, each old share being replaced with 5 new shares. Meanwhile, in 1925, all preferred stock was retired and at the present time there are 15 million shares of common stock issued, with authorization for 25 million. Since 1909, losses have been incurred in but four years—1921, 1931, 1932 and 1934—although the factory operated in the red for 1947, the deficit being more than made up by subsidiary company profits.

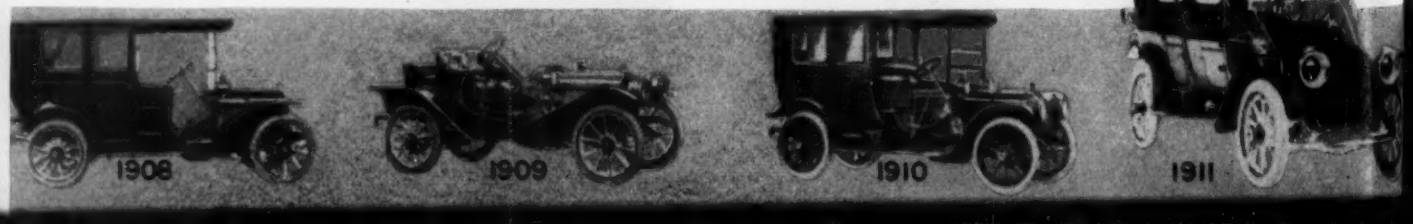
Peculiar Sales Technique—From practically its inception, the company followed a policy of retail selling through subsidiary companies, a technique peculiar to Packard. At one time or another there have been 14 subsidiary organizations engaged in retail selling. The first to appear was Packard Motor Car Co. of New York, an outgrowth of the old Adams & McMurtry firm, where Henry Joy purchased his first car. Some of these sales units were only temporary in character, until a satisfactory independent distributorship could be arranged. Three survived until 1937 but by last year all had been dissolved, including the New York outfit which had been the largest. Canadian and export sales continue to be handled through subsidiaries.

The long-established policy of avoiding radical annual model changes was maintained until 1934 when a sharp break from tradition appeared with the installation of George Christopher as assistant vice president of manufacturing.

Weathers Dark Days—The Packard factory operated through the dark days of 1933 and employees were paid in cash through the bank holiday which was more protracted in Michigan than elsewhere. Hugh Ferry, treasurer, played a leading part in guiding affairs of the company, and in fact much of the Detroit financial community, through this trying period.

Despite garnering over 42 per cent of all the "high-priced" business available in 1934, directors could read the handwriting on the wall in the wake of the terrific economic depression which the country had been through, and determined to move into the $1000 price class with a new line of 8-cylinder cars to be called the Model 120, priced at $980 to $1095. They were followed almost immediately by the Model 115, a 6-cylinder type priced at $895 to $1010.

Tooling up a plant to move into volume manufacturing—at least "volume" by earlier comparison—called for the generalship of someone familiar with this field. Christopher had shown his genius at Pontiac and Buick



PACKARD MOTOR CAR COMPANY

Calendar Year Output of Cars and Trucks

Year	Passenger Cars: Fours	Sixes	Eights	Twin Sixes	Total	Trucks	Total Vehicles
1899	The first Packard (Model A) was completed Nov. 6, 1899. Subsequent records on output in these years are incomplete but authoritative sources refer to three cars (Model B) in the first national auto show, 1900, five 1901 (Model C) cars in an endurance run and a 1902 Packard (Model F) in a Long Island fuel economy test. All were one-cylinder models.						
1900							
1901							
1902							
1903....	33	....	....	....	33	....	33
1904....	250	....	....	....	250	....	250
1905....	481	....	....	....	481	....	481
1906....	959	....	....	....	959	....	959
1907....	1,403	....	....	....	1,403	....	1,403
1908....	1,803	....	....	....	1,803	27	1,830
1909....	3,106	....	....	....	3,106	110	3,216
1910....	3,084	....	....	....	3,084	411	3,495
1911....	1,788	733	....	....	2,521	774	3,295
1912....	282	2,038	....	....	2,320	1,159	3,479
1913....	....	2,984	....	....	2,984	967	3,951
1914....	....	2,623	....	....	2,623	1,381	4,004
1915....	....	1,191	....	1,454	2,645	4,000	6,645
1916....	....	....	....	10,645	10,645	5,092	15,737
1917....	....	....	....	7,902	7,902	7,116	15,018
1918....	....	....	....	2,741	2,741	5,930	8,671
1919....	....	....	....	3,589	3,589	6,668	10,257
1920....	....	1,042	....	5,194	6,236	5,907	12,143
1921....	....	6,374	....	1,310	7,684	1,331	9,015
1922....	....	13,433	....	1,944	15,377	2,145	17,522
1923....	....	14,123	2,721	323	19,169	466	19,635
1924....	....	9,583	5,664	....	15,247	....	15,247
1925....	....	26,575	5,550	....	32,125	....	32,125
1926....	....	29,761	5,146	....	34,907	....	34,907
1927....	....	31,686	4,794	....	36,480	....	36,480
1928....	....	19,449	30,605	....	50,054	....	50,054
1929....	....	....	48,318	....	48,318	....	48,318
1930....	....	....	28,177	....	28,177	....	28,177
1931....	....	....	13,123	....	13,123	....	13,123
1932....	....	....	7,436	582	8,018	....	8,018
1933....	....	....	8,621	1,049	9,670	....	9,670
1934....	....	....	5,377	694	6,071	....	6,071
1935....	....	....	51,475	781	52,256	....	52,256
1936....	....	23,518	56,232	949	80,699	....	80,699
1937....	....	56,319	52,113	1,086	109,518	....	109,518
1938....	....	29,105	20,832	323	50,260	....	50,260
1939....	....	44,692	31,601	280	76,573	....	76,573
1940....	....	50,136	26,791	....	76,927	....	76,927
1941*...	....	21,479	45,427	....	66,906	....	66,906
1942‡...	....	2,876	3,209	....	6,085	....	6,085
1943....	WORLD WAR II						
1944....							
1945†...	....	....	2,722	....	2,722	....	2,722
1946....	....	15,982	26,120	....	42,102	....	42,102
1947....	....	15,218	40,259	....	55,477	....	55,477
1948....	....	3,264	95,633	....	98,897	....	98,897
1949....	(Jan.-Mar.)		30,095	....	30,095	....	30,095
TOTAL.	13,189	426,186	648,041	40,846	1,128,262	43,484	1,171,746

* Output limited from August onward.
‡ Output halted February 9.
† First postwar car completed October 19.

in such work, and was persuaded to come out of a 70-day retirement on his farm to do the job. He was signally successful. The plant was overhauled, new machinery purchased, new tools and dies ordered, extensive market research launched, advertising stepped up, and a new driving spirit permeated the organization. Production roared up to 49,000 in 1935 after hitting low ebb at 6427 the year previous. The tempo increased in 1936 and 1937, touching an all-time peak of 109,518 units.

Christopher Goes To Work—When Christopher rolled up his sleeves to go to work, he took over from E. F. Roberts, director of manufacturing and active with Packard since 1905, the understanding being Roberts wanted to retire once Christopher had the feel of the task. There was a new 8-cylinder car started through engineering, vaguely aimed at the $1500 price class. Christopher turned thumbs down and said it would have to sell at $1000 to click. He sharpened his pencils and began making estimates. A new press shop had to be built and it went up in buildings formerly devoted to truck manufacture. A new motor machining line also was equipped to handle a production rate of 24 an hour. By the time the car was going, the figures showed Christopher's estimates were practically "on the button."

Taking the cue from the success of Olds and Pontiac in selling both six and eight-cylinder engines in virtually the same chassis, Christopher rushed plans for a six to be in production in 1936. At first, buyers rushed to the new model but eventually the inherent smoothness of the eight won them back and Packard's third venture into the 6-cylinder field was terminated gradually following World War II.

Long experience in various types of engine design and production made Packard a natural for undertaking the assignment for building Rolls-Royce Merlin aircraft engines as war clouds gathered. At first, Ford was approached with the proposition, ultimately turning it down because of the complexity of transferring to U. S. standards and tolerances the complicated British specifications for the 14,000-odd parts going into the engine. The British urgently needed 9000 engines, the U. S. air forces would take 3000. At the urging of the late General Knudsen, Packard officials O.K.'d the project on June 26, 1940, and all hell broke loose in the company's plants as they began to be literally uprooted.

Plant Revamped—The entire press department which turned out stampings for bodies was cleared of all equipment which was stored out in the open for a time under tarpaulins, later to be sold to a wide variety of buyers and never to return to its original location. The department was turned over to machining of components for the aircraft engine and the company was without a body shop for the first time in its history.

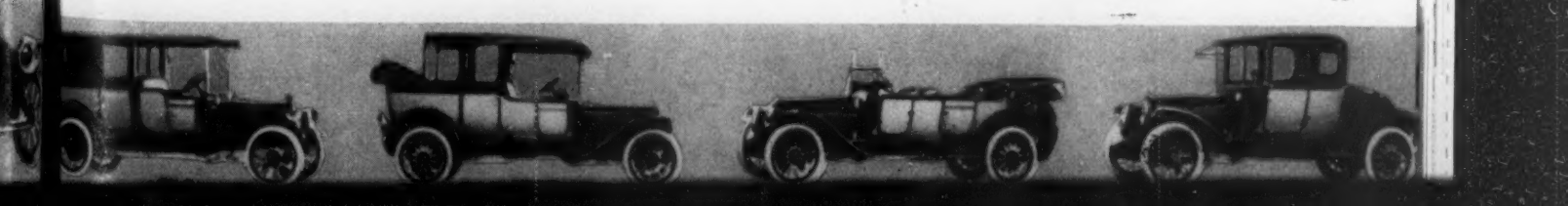
Ten months after the contract was awarded, new tools were in position, crews of workmen trained, larger new buildings erected and output started to inch ahead. The first Rolls-Royce was tested Aug. 2, 1941. By V-J Day in 1945, the tally showed 55,523 engines completed, a total exceeding that turned out by all five British plants building the same engine. In the four-year interval, Packard engineers made numerous improvements in the strength and power of the inverted V-12 engine.

Meanwhile a companion engine project was being carried out in furnishing V-12 units for powering the Navy's patrol-torpedo (PT) boats. In April 1939, an order for seven experimental engines was received and it was the hope to adapt the model 2500 airplane engine to the job, the latter having been built some years before. However, the idea proved impractical so designs went ahead on an entirely new version, a development program which resulted in a loss of $300,000 on the first seven engines. New orders came along, however—one for 81 engines late in 1939, then $17.5 million for engines and parts in 1940, another $19 million in 1941. In all, 13,000 of these Packard-designed engines were built.

Marine engines were continued in production following the war, for pleasure and commercial craft. One is a 150-hp 8-cylinder unit, another a 100-hp six. Early in 1949 a third type of six was introduced.

The war's end and the need for quick reconversion to automobile production caught Packard with "its plants down" just as it did most of the auto industry. There had been little time for postwar planning. The physical task of clearing plants of government material and reorganizing assembly lines was enormous. Steel was in tight supply; parts manufacturers were not ready. The prewar body stamping and assembly facilities were gone. Worker productivity during the war had sagged badly and labor relations were none too healthy. Sales organization had almost disintegrated.

Reconversion — Arrangements were concluded with Briggs Mfg. Co. to take over body production and this company set about to equip two plants—one of them



BOARD OF DIRECTORS

Top Management Team

HUGH J. FERRY
Vice President, Secretary and Treasurer

GEO. T. CHRISTOPHER
President and General Manager

G. H. BRODIE
Assistant to President

J. G. VINCENT
Vice President of Engineering

G. C. REIFEL
Vice President of Manufacturing

KARL M. GREINER
Vice President and Gen. Sales Mgr.

E. C. HOELZLE
Vice President and Comptroller

MILTON TIBBETTS
Vice President and Patent Counsel

H. W. HITCHCOCK
Director of Adver. and Public Relations

C. W. BROWNELL
Industrial Relations Manager

B. C. BUDD
Manager, Packard Export Division

W. H. GRAVES
Vice President and Director of Eng.

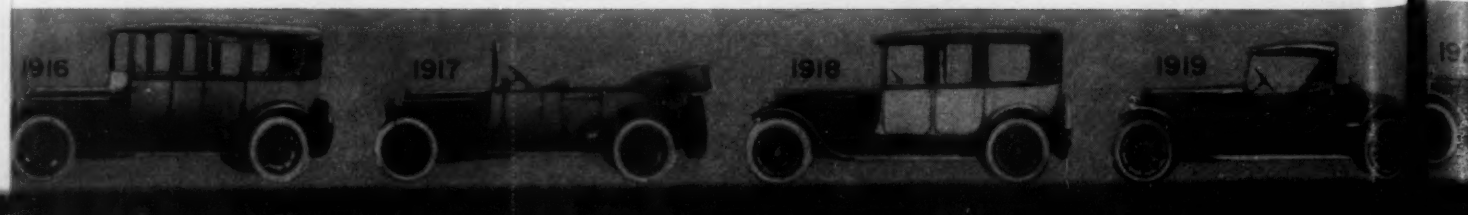
R. R. REES
Purchasing Director

C. E. BRIGGS
Ass't. General Sales Manager

W. B. HOGE
Assistant Comptroller

PHOTO AT TOP:

Packard Motor Car Co.'s board of directors (left to right): W. Tom Zurschmiede, Henry C. Bogle, Hugh J. Ferry, James McMillan, Col. J. G. Vincent, Earle C. Anthony and George T. Christopher



war-built for aircraft fuselage component manufacture —for exclusive work on Packard bodies. Lines were laid out to supply an eventual 70 bodies an hour, to be trucked, seven to a truck-trailer unit, to Packard's new assembly lines some 3 miles distant. Meanwhile at Packard ingenious $25 million twin assembly lines were laid out to occupy a court between two buildings which was roofed over to house the lines. Pits were dug under the conveyor lines, providing a spacious area in which workmen could assemble underbody parts as the cars moved down the line. Conveyors brought parts and supplies within easy reach of workmen. This was a new technique in the industry and it produced many grave doubts at the start. However, it has proved highly successful, coordinated as it is with the overhead conveyor system which brings parts and subassemblies from three levels of adjacent buildings, the entire layout being integrated by teletype as well.

The first postwar body met its chassis Oct. 19, 1945 and by the end of the year 2722 units had been built. However, it was to be a long time before the planned production rate could be achieved, the principal stumbling block being shortage of flat-rolled steel. Prewar Packard had purchased much of its sheet and strip from smaller mills, three of which were bought up postwar by fabricators who likewise were hard pressed for material. By hard scraping Packard could round up enough material for about 4000 cars a month, far short of what new schedules needed and what dealers were pleading for.

Steel Supply Pinch—Packard had no position with the large mills for allocations of sheet and strip, so extraordinary steps were called for if the steel problem was to be licked. Various plans were studied for obtaining tonnage; some came within an ace of being activated. Finally it was decided, in co-operation with several other steel users, to advance funds to the International Detrola Corp. which had taken over electric furnaces and rolling mills at Newport, Ky., partially built up during the war by Andrews Steel Co. This was early in 1947, and several million dollars were involved in the transaction, to be credited against later shipments of ingots and eventually hot and cold-rolled sheets and heavy-gage strip for frames and wheels. Price was to be the average Detroit delivered price of five leading steel mills.

Late in 1947 the first ingots were received and it was then necessary to locate facilities for having them rolled to finished material, pending completion of Newport's rolling mills. Meanwhile ingots were being purchased on other "conversion" arrangements. It was necessary for Packard to give suppliers help on steel as well, for everything over 5000 cars a month, on wheels, frames, bodies and other parts.

Upshot was that both 1946 and 1947 saw Packard production restricted by lack of basic materials, since it was 1948 before steel began moving under the Newport arrangement at the projected figure of 6200 tons a month. Further, in 1946, there were experienced interruptions because of 47 strikes in suppliers' plants, plus a week lost by a walkout of Packard maintenance men. The company's operations were in the red, despite production of 42,102 cars. This was boosted to 55,477 in 1947 which was still not enough to bring factory operations into black ink. However profits from sales subsidiaries and an income tax refund a little better than canceled out the loss. Full effect of the emergency planning on materials was not realized until 1948, when output soared 88 per cent to 98,897 units, bringing with it comfortable earnings and the resumption of dividends.

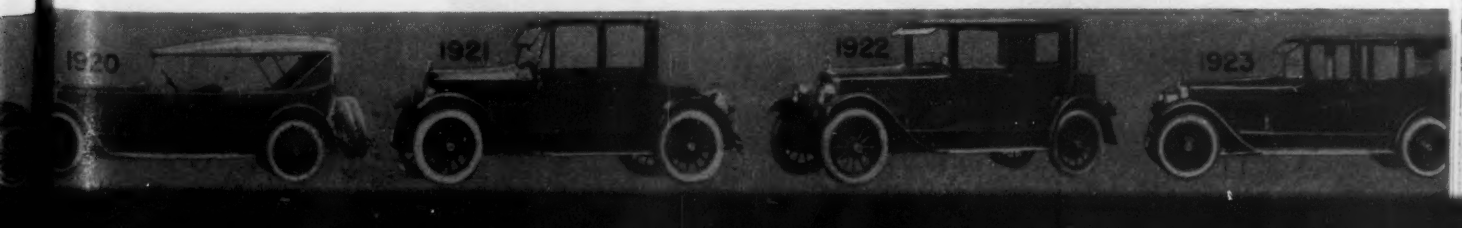
Streamline Management—Meanwhile, President Christopher, when not busy concentrating on relieving materials shortages, had been streamlining his top management team and developing new techniques in labor relations. As shown elsewhere, the present 15 top executives, averaging 56 years of age, also have an average of 28 years of Packard service each and 33 years of auto industry experience. Two of them—Milton Tibbetts and George H. Brodie—have spent 42 years with Packard. Hugh Ferry has 39 years, Col. J. G. Vincent 37 years, and George C. Reifel 36 years. Three others have had 34 years with the company, another 30 years. Such lengthy careers with a single company are perhaps peculiar to Packard of all the motor car companies.

Significant changes were made in the board of directors about a year ago. Truman H. Newberry, last of the original directors who guided the company practically from its Detroit inception in 1903, died in 1945 and was succeeded by Colonel Vincent. Last year, Chairman Macauley and Directors Henry E. Bodman and Robert B. Parker, all at least 30-year veterans, retired, to be succeeded by W. Tom Zurschmiede, active in direction of a Detroit department store and numerous other enterprises; Earl C. Anthony, veteran California dealer and distributor since 1905, and Henry C. Bogle, member of the law firm which is Packard's legal counsel.

Labor Relations Progress—In the field of industrial and labor relations, major postwar strides have been made. First, a management engineering firm was employed, starting in 1945 to teach a class of 13 union men and an equal number of management the basic elements of time study, and all at a considerable cost. However, with their own men trained in time-study work, union members' grievances on this score can be rationalized and just claims presented to management, reducing the friction resulting from fancied "speedups." Second, the same company carried out extensive aptitude and character tests for all supervisors, and even many executives, providing data helpful in planning new assignments. Third, foremen have become more closely identified with management by organization of an executive supervisors council of six men, rotated every three months, to strengthen lines of communication between members of management.

Similarly, in the sales field, a dealers' advisory council of nine members, serving one year each and meeting quarterly, was established in 1945 to transmit dealer recommendations to the management. Only recently, this group suggested granting three-year franchises to qualifying dealers, instead of the customary annual franchises, a proposal which was approved and is now in effect.

Five Distinct Periods—So much for Packard as it has moved from 1899 to 1949. In summary, there have been five distinct periods or eras in the company's half-century development. The first was 1899-1903, the formative years when the Packard brothers experimented with their horseless carriage and joined with Detroit capital to launch the enterprise. The second was 1903-1909 when manufacture of 4-cylinder models gradually accelerated in the new Detroit plant. The third, 1909-1916, might be considered the Henry Joy era, when, after incorporation as a Michigan concern, the business prospered under its dynamic leader before he turned the reins over to Alvan Macauley in 1916. From the latter year to 1934 was the Macauley era when output moved ahead leisurely in the fine-car field. From 1934 to the



present has been the "Christopher" or latter-day period, with the transition to high-volume manufacture as described earlier. Interestingly enough, 64 per cent of the company's half-century production total was realized in this last 15-year period.

At this point it is apropos to take a look at the plant as it is constituted today, to review its facilities, to examine how they are integrated and co-ordinated. The mile-long grouping of one to five-story structures and one small seven-story unit comprising Packard today stretches northward and southward from East Grand Boulevard in Detroit, entirely hemmed in by residential and industrial areas and split by three main crosstown arteries. Total plant area is 4,494,863 sq ft, of which 4,180,965 is utilized by manufacturing departments.

It is divided roughly into seven divisions. The foundry, at the far north end of the property, has four cupolas, operating two at a time, producing hard and soft iron for cylinder blocks, flywheel housings, exhaust and intake manifolds, water and oil pumps, bearing caps and flywheels. Employment is 947 and maximum two-shift capacity provides the above castings for 800-850 cars a day. Current production has been running about 600 cars daily.

Forge Shop—A forge shop, operating both hammers and presses, supplies connecting rods, wheel support elements, steering knuckles; cluster, ring and differential side gears; pinions, cross shafts, clutch shafts, clutch rings, shifter levers and shifter forks. Employment here is 250 and production has been running at the equivalent of 80 cars an hour, with maximum capacity for 125 an hour.

One of the largest manufacturing divisions is motor machining, engine assembly and testing, set up for 80 engines an hour, and employing 1775. Elements machined in this unit include cylinder blocks and heads, crankshafts, camshafts, crankshaft and camshaft gears, complete flywheels, pistons, connecting rods, piston pins, oil and water pumps and intake and exhaust manifolds.

Handling all metal finishing, painting and assembling of front fenders and hoods, as well as final assembly operations and paint repair on finished cars is a so-called body assembly section, employing 1900. Until the model changeover, the assembly rate was 70 cars an hour on a single shift, peak capacity being not over 75 although it is readily possible to operate this department on two shifts, assuming certain other bottleneck departments could be pushed up to three shifts.

Machining and assembly of transmissions, rear axles and front suspensions is carried out in No. 12 division, employing 850 and capable of turning out 600 sets of the above units daily on two shifts. The new Ultramatic torque-converter transmission to be offered on custom models of the Golden Anniversary series will be produced in a separate division, known as No. 15, and currently being equipped for production of 40 units hourly. Expenditure of $7 million for machinery and equipment has been made since the project was initiated last year.

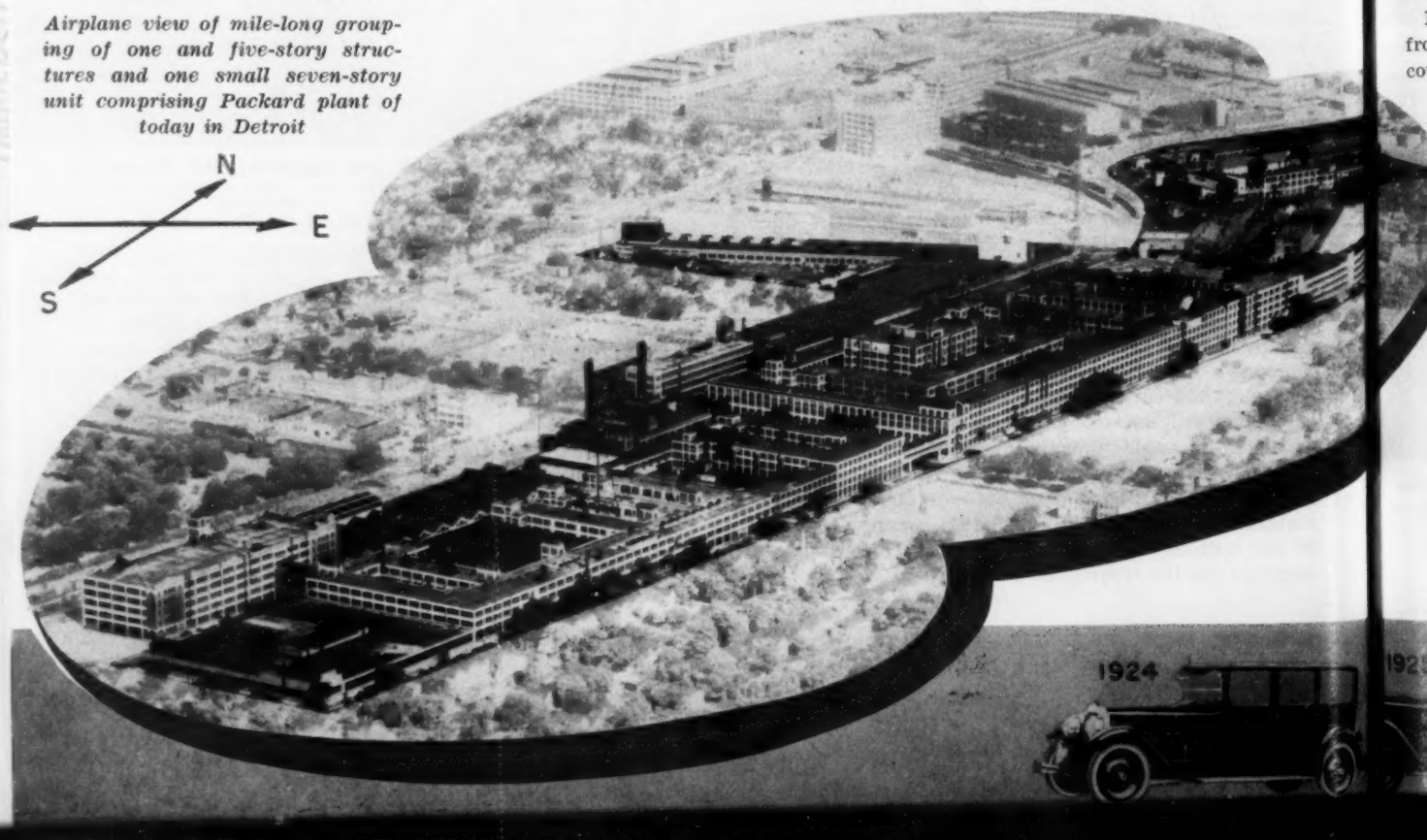
Special Projects Unit—Assembly of miscellaneous details and instrument panels to bodies received from Briggs, and complete trim work on certain body types, is in the hands of No. 11 or the "special projects" unit, employing 512 and geared to a production rate of 80 per hour. For the present it is integrated with No. 06 stamping division which naturally has shrunk considerably since 1942 when the body and press shops were dismantled. Stamping now is confined to miscellaneous chassis components, although there is a trend toward bringing more stampings back into the plant, instrument panels being one example. Personnel of 06 division numbers 200 and production is set to the pace of 70 cars an hour.

The list is completed by the marine and industrial engine division, No. 16, which for the present is busied principally on special reduction gears for marine engines and the assembly thereof. Employment is only 70, but there are a number of plans for greatly expanded activity in this phase of operations.

Under the manufacturing vice president, George C. Reifel, are ten units, and they constitute the core of the entire manufacturing setup. They are: Factory management, master mechanic, purchasing, manufacturing control, inspection, metallurgical, plant engineering, traffic and salvage. The tenth is the new automatic transmission section which eventually will come under direction of the factory manager although at present reporting direct to the manufacturing vice president because it is a new operational phase and requires more concentrated attention than it will after it is functioning normally.

Reference to the accompanying organizational chart

Airplane view of mile-long grouping of one and five-story structures and one small seven-story unit comprising Packard plant of today in Detroit



of the entire manufacturing division will show how the preceding plant units are grouped under factory manager F. J. Bird. All of them submit regular reports, some daily, some monthly, along with yearly summaries, covering such subjects as production schedules, detailed cost breakdowns, lost-time accidents and equipment acquisitions.

Manufacturing Control—The most recently constituted of these divisions, other than the automatic transmission unit, is manufacturing control, and it is also one of the most important from the standpoint of overall planning for efficient and profitable production, covering such phases as receiving, scheduling, follow-up on materials and parts from vendors, budget preparation and analysis, and the like, as indicated on the chart.

The major share of manufacturing control's activity is in the production control subsection under direction of John P. Meldrum. Through his staff production schedule projections are established, in consultation with the sales department and administrative officials. These are related to component requirements which in turn are separated into those to be made inside the plant and bought outside. Requisition schedules are drawn up and shipping releases prepared. These are issued to the purchasing department for actual placing of orders.

Procurement—A group of 20 "procurement specialists"—some plants call them follow-up personnel—is assigned the task of checking on vendors, each man being assigned a certain group. As schedules are revised, this staff immediately issues new shipping instructions to vendors and follows on them. There are about 4000 part numbers covering a single car, so the magnitude of the follow-up job can be appreciated. Of these, 25-30 per cent are parts produced in the plant.

Different floats are carried, depending upon the part involved. Body releases are issued about 5 days ahead of final assembly; other parts have lead time on up to 60 days. A stock of perhaps 5000 frames is maintained in storage, shipments coming from A. O. Smith Corp., usually seven or eight cars at a time, with 86 to the car.

A good idea of the time intervals involved in actual assembly operations may be gained by reference to an accompanying flow chart, prepared when only one assembly line was being operated, and at a rate of 35 hourly.

Production control receives daily performance reports from all manufacturing departments, showing the actual count on every piece in production and indicating whether operations are over or under schedule. Further integration with manufacturing, and with the Briggs body plant, has been perfected by an elaborate system of teletypes, detailed in an accompanying chart.

Close tie-in also is maintained with the accounting department. Packing tickets are sent by general receiving to production control where they are matched against invoices, approved and then forwarded to accounting for payment.

Still another phase of production control relates to expediting the flow of materials, from the time they are received in the plant until they are used in assembly. Extent of materials handling operations is shown by a few figures. Through the Packard plant there are 16.6 miles of conveyors—53,310 feet of overhead power chain type, 19,150 feet of floor power chain, 3000 feet of belt conveyor for foundry sand, 2430 feet of monorail manual type, and 9900 feet of gravity or plain roller conveyor. In addition a fleet of 120 power trucks is operated—fork, low-lift, tugs and tractors—over 100 of them battery-powered, the rest gasoline. Smaller loads are moved by 50 electric-powered hand "transporters," and there is a large number of trailers which can be pulled singly or in trains.

Palletize Incoming Shipments—Important strides have been made in persuading suppliers to palletize incoming shipments of parts and materials. At present, about 50 per cent of such parts are palletized, using all types of pallets in both expendable wood or paperboard, or the returnable wood, steel or aluminum.

Conveyorization is the answer to efficient movement of parts and subassemblies between departments. This is particularly true at Packard with its multistory manufacturing buildings. Ramps for trucks are dangerous and take up a lot of space. Elevators are slow. Overhead chain conveyors can move between floors and between buildings, with minimum of attention, and at the same time providing a moving "float" of parts in process.

Truck shipments of materials and parts have increased in recent years, necessitating the installation of more receiving docks for trucks. The main receiving room for trucks, built since the war, can handle four trucks at a time in its two wells, and is equipped with special hydraulic elevator-type docks which can be adjusted to the level of truck floors. Several rail docks are provided throughout the plant, both inside and outside, accommodating from two to five cars each.

Productivity Trends—Manufacturing control keeps careful track of productivity trends. Figures indicate that this factor has never regained the level of pre-union days, but has climbed appreciably since the war. In 1935, for example, productivity was calculated overall at 90-92 per cent. After 1937 it dropped to 86-88, then down to 60-65 in 1943 as thousands of green workers were employed on war work (Packard employment hit a war peak of 41,000, currently is 11,500), moved up to 84-86 by late in 1945, and just before the model change this year was back close to 90. These figures are based on definitely established standards, not subject to change and incorporating fatigue allowances.

Working closely at all times with manufacturing control is the purchasing department, headed by R. R. Rees, a Packard veteran of 34 years who came up through plant engineering. Volume of purchases last year (production: 98,897 cars) was approximately as follows:

Productive parts (including bodies)	$127,635,000
Raw materials	4,146,883
Machinery and equipment	1,542,000
Supplies, including tools, maintenance and all miscellaneous nonproductive materials	5,250,000
Service parts and accessories	5,700,000
Total	$144,273,883

The departmental organization is relatively simple, comprising a staff of 17 buyers and 23 clerical assistants. Ten buyers handle productive parts, two being assigned to the Briggs body account. Outside purchases account for approximately 80 per cent of the dollar volume of total annual requirements, and half of this represents bodies. The other 20 per cent is manufactured in the plant.

Manufacturing Division

VICE PRESIDENT OF MANUFACTURING G.C. REIFEL

EXECUTIVE ASSISTANT C.R. HERRICK

5950 SALVAGE MANAGER J. HAMMERL
- GENERAL FOREMAN J.A. LACOURSE
  - Drivers Plant Chips Steel Baler J. Bausano A.F.
  - Chip Salvage Bldg 24 W. Taylor A.F.
  - Material Salvage Bldg 5, Yard 72 H. Jessen A.F.
  - Paper & Misc. Yard Scrap Bldg 60 & Yard 65 H. Jensen A.F.
  - Sales and Clerical R. King A.F.

5150 FACTORY MANAGER F. J. BIRD
- SPECIAL ASSIGNMENT F. ROSSMAN
- 0450-MANAGER FOUNDRY O.F. CARPENTER
  - ASSISTANT MANAGER J. SCHAEFFER
- 0550-MANAGER FORGE G.F. DASCHKE
  - SUPERINTENDENT H. LAWSON
- 1050-MANAGER MOTOR MACH. & ASSY. & SERVICE PARTS G.F. DEISLINGER
  - ASSISTANT MANAGER W. BECKLEY C. BOLDIN
- 1150-MANAGER SPECIAL PROJECTS TAXI-STA SED - 7 PASS. L. SADOWSKI
- 1250-MANAGER TRANS. & REAR AXLE HEAT TREAT & PLATE O.G. PADGETT
  - ASSISTANT MANAGER R. REEVES
- 1450-MANAGER CAR ASSEMBLY AND PAINTING R.C. JACKSON
  - ASSISTANT MANAGER A. MOTLEY
- 1650-SUPERINTENDENT MARINE ENGINE MACHINING & ASSY. F. BENOIT

1550-MANAGER AUTOMATIC TRANSMISSION E.G. PATZKOWSKY
- ASSISTANT MANAGER L. LEMKE
- 1501-HEAVY MACHINING 1st. FL., BLDG. 47-48-49
- 1502-STEEL PARTS MACH'G 4th FL., BLDG. 92
- 1503-CAST IRON PARTS MACH. 4th FL., BLDG. 92
- 1504-ALUMINUM PARTS [illegible] 5th FL., BLDG. [illegible]
- 1505-ASSEMBLY & TE[illegible] 5th FL., BLDG. 92

4950 DIRECTOR OF PURCHASES R.R. REES
- BODY MAT'L BUYER
- PRODUCTION MATERIAL BUYER
- NON-PROD MATERIAL BUYER
- INVESTIGATION
- STATISTI[illegible]
- PLANT ENGINEERING FOLLOW UP H. A. GARVEY

5750 GENERAL PLANT ENGINEER K.R. PARKER
- PLANT ENGINEER R.E. COLLINS
  - CIVIL ENGINEERING MECHANICAL ENG'NG DESIGN
  - EXECUTIVE ASSISTANTS
  - PLANT PROTECTION GUARDS FIREMEN
  - Millwrights
  - Pipefitters Plumbers
  - Carpenters Painters
  - Electricians Tool Repair Elevator Operator
  - Janitors Laborers Bricklayers
  - Stores Stock Rooms
  - Ironworkers Welders Tinsmiths
  - Truck Repair
  - POWERHOUSE operation and maintenance

5550 MASTER MECHANIC A.H. GROSSMAN
- ASS'T MASTER MECHANIC G.P. KREIG
  - PROCESS & TOOL ENGINEERING J. COOK-CHIEF PROCESS ENGINEER
    - PROCESSING Motor Division Marine Division
    - PROCESSING South Division Forge " " Foundry " Assembly"
    - DIVISIONAL TOOL ENGINEERS
  - MACHINE TOOL SPECIFICATION PURCHASING & SELLING RECORDS-APPROPRIATIONS BUDGETS-CENTRAL CLERICAL F. CHESBRO SUPT.
    - APPROPRIATIONS BUDGETS CENTRAL CLERICAL
    - MACHINE TOOLS Specifications Purchasing Selling Records
  - TOOL DESIGN TOOL ESTIMATING & FOLLOW UP H.J. CRAIN - CHIEF TOOL DESIGNER
    - TOOL CRIBS & TOOL STORES
  - TOOL CRIBS & STORES MANUFACTURING RESEARCH T.R. McKAY SUPT.
    - MANUFACTURING RESEARCH
      - Check Vendor Tool Cost
      - Check and Approve Engineering Alterations For: tool cost, effective date, tool disposition and run-ahead queries
      - Service Committee
      - New Methods
      - Schedules and charts
      - Briggs Manufacturing Company Engineering and Export Contact
      - Production Studies and Cost Estimates Approvals
      - Lubrication and Coolants
  - CUTTER GRINDING & POLISHING WHEELS
  - PLANT LAYOUT
  - TOOL MAKING & MAINTENANCE
  - TOOL INSPECTION
  - MACHINE MAINTENANCE MAIN & NORTH DIVISIONS
  - MACHINES, TOOLS, DIES & PRESS MAINTENANCE SOUTH DIVISION

4150 CHIEF INSPECTOR G.K. PEETS
- ASS'T CHIEF INSPECTOR O.F. SEPANEK
  - BRIGGS CONTACT L.E. BROWN
  - ENGINEERING CONTACT J. McKAY
  - SPECIAL ASSIGNMENT W.H. SMITH
  - EXECUTIVE ASSISTANT C.W. STEMLER
  - 0441 Foundry
  - 0541 Forge
  - 0641 Stamping 0741 Plate-Pol 1241 Trans. R.A. 1541 Aut. Trans.
  - 1041 Motor Mach. and Assembly
  - 4155 Receiving Inspection
  - 1141 Taxicab - 7 Pass. Inst. Bd. Assy Body Receiving
  - 1141 Car Assembly
  - 1641 Marine Engine Parts
  - 4041-Exports 8841-Service 1041-Service Machine

4850 TRAFFIC MANAGER A.D. COLLINS
- Product Shipping
- Rates Class'cation Technical
- Claims Passenger Reservation Rout'g, Trac'g & Office Cler

4250 CHIEF METALLURGIST R.E. VanDEVENTER
- Physical Testing Machine Shop Physical Testing
- Heat Treating Forging-Machining Welding & Brazing Tool Steels Metallography
- Steel Specifications Non-Ferrous Spec's Mat'l Approval and Records Magnaflux
- Foundry Metallurgy " Laboratory " Materials " Processes X-Ray Laboratory
- Paint Materials Paint Processes Rubber-Plastics-Wood-Flock
- Fuels Lubricants Cutting Oils-Gaskets Paperboard-Felt Metal Cleaners Trim Materials Industrial Hygiene
- Plating Materials Plating Processes Pickling-Parkerizing Adhesives Sealers-Deadners
- Calibration Pyrometers Hardness Testing Mach's Scales

MANUFACTURING CONTROL MANAGER-5250 M.F. MACAULAY

COST CONTROL DIVISION MANAGER J.G. GILLAND
- Procedure Control
- Product Analysis
- Time Study & Job Evaluation
- Estimating
- Tabulating

BUDGETS & PROJECTS MANAGER R.E. MARGENAU
- Budget Analysis Control Reports
- Project Analysis

PRODUCTION CONTROL DIV. MANAGER J.P. MELDRUM

GENERAL RECEIVING CENTRAL OFFICE BUDGET CONTROL
- Planning Alterations & Requirements
- Planning Manufacturing Instructions
- Scheduling Sales Orders
- Procurement
- Statistical Teletype
- General Receiving

GENERAL SHIPPING MASTER SCHEDULING DIVISIONAL PROCEDURES COORDINATING ALL MATERIAL DEPARTMENTS
- Packaging and Boxing, Misc. Shipping
- Gen. Trucking Service Shipping
- 04-05 Div. Mat'l Control
- 06-07-12-15 Div. Mat'l Control
- 10-Division Mat'l Control
- 11-Division Mat'l Control
- 16-Division Mat'l Control
- 14-Division Mat'l Control

MATERIAL CONTROL PERSONNEL COORDINATION THROUGHOUT ALL PRODUCTION CONTROL DEPARTMENTS

J. P. MELDRUM
Production Control

R. E. VAN DEVENTER
Chief Metallurgist

FLOYD J. BIRD
Factory Manager

E. G. PATZKOWSKY
Manager
Automatic Transmission

1929

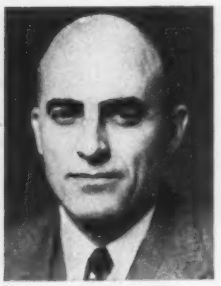
. F. MACAULAY
Manufacturing Control Manager

R. R. REES
Director of Purchases

A. D. COLLINS
Traffic Manager

J. HAMMERL
Salvage Manager

A. H. GROSSMAN
Master Mechanic



K. R. PARKER
General Plant Engineer

After a manufacturing schedule has been approved by top management, there are five basic types of standard forms used to authorize and complete purchases. They are:

1. Bill of material, issued by the Engineering Division.
2. Production release card.
3. Purchasing requisition, issued by Production Control to purchasing.
4. Purchase order issued by Purchasing to supplier.
5. Purchase order change issued by Purchasing to supplier when a change in quantity, price or specification is involved after the original order has been issued.

Thousands of Suppliers—The company is served by about 3500 suppliers, covering both productive and non-productive items. Of these, approximately 400 furnish productive parts and materials, while a total of perhaps 1750 may be considered in the active or regular category for all types of purchases. Four simple qualifications which suppliers must meet are:

1. He must have manufacturing facilities to maintain quality of product to Packard specifications.
2. His personnel must be well trained and properly managed.
3. He must be adequately financed to carry out his contract.
4. His prices must be competitive.

A basic function of the purchasing department is to select carefully vendors who can qualify under the above, with the added ability to meet shipping schedules. Cost trends and general wage trends on all raw materials are charted graphically every week and are used as the basis for determining any price changes with suppliers, whether they be up or down. Both new and established supplier representatives are interviewed by buyers three days each week, Monday, Wednesday and Friday.

Purchase orders are placed with suppliers for production material usually on a four-month basis, releasing the vendor four months in advance for procurement of materials and a maximum of three months for fabrication. The release, however, will vary with different suppliers, depending upon availability of material, cycles of operation, or other factors. Thus, if a company can effect economies by setting up long runs on a part, then he may be covered for a greater period of time.

It is essential that the purchasing department work in close co-operation with both engineering and inspection, as well as with manufacturing control. One system adopted to further such co-ordination is through bi-weekly "alteration" meetings, at which changes in car parts are discussed pro and con, and then either authorized or rejected. Such changes in design or specification may be proposed by suppliers, engineering, inspection or manufacturing control.

Tool Amortization—It is the policy to figure on amortizing tool costs over the run of a single model, although depending upon the character and cost of the tools, the amortization period may be longer or shorter. Major investments in capital equipment and machinery require approval of appropriations by the president, comptroller and vice president of manufacturing, before they can be activated by Purchasing.

Concentrated load on Purchasing starts about four months before a new model is placed in production and continues until after the projected assembly pace has been reached. The Golden Anniversary or "23rd series" model was launched last month, so the principal concern of Purchasing at the moment is to work for lower costs of materials and parts. In the past four months, competition has returned in many lines of purchased parts with the usual trend toward price shading by vendors. Castings, stampings and screw machine products are notable in this respect. Average increase in costs of purchased chassis parts since 1942 is 59.8 per cent, in body parts 54.5 per cent, although individual increases range to better than 100 per cent, particularly where raw material is the major element of cost.

It has been the policy of Purchasing to bring up new buyers from the "procurement specialist" staff of Manufacturing Control, since in their follow-up work, these men are the closest to the requirements from suppliers and are in day-to-day touch with fitting parts needs to production schedules.

As pointed out previously, the Inspection Division works closely with Purchasing. Packard inspection operations are detailed and thorough, covering everything from incoming materials to outgoing cars. A staff of 480, including 75 in supervisory category, functions under Chief Inspector G. K. Peets who regards his responsibilities as not only inspection but quality control as well. He feels that good inspection is not a matter of stopping a production line every time a defective part is discovered, but rather being forehanded enough to keep lines moving continuously by discovering imperfections soon enough so they can be corrected without delaying manufacturing.

The following tabulation shows the ratio of inspectors to productive employees annually back to 1934 when Pack-

ard stepped up its volume with introduction of the 120 model:

Year	Production, average	Inspection, average	Ratio, Inspection to Production
1949	5546	355	1:15.6
1948	4984	306	1:16.2
1947	3277	273	1:12.0
1946	3070	248	1:12.3
1945	2080	187	1:11.1
1944	4482	388	1:11.5
1943	5242	453	1:11.5
1942	2756	249	1:11.0
1941	4363	281	1:15.5
1940	6424	397	1:16.1
1938	4967	367	1:13.5
1937	9276	513	1:18.0
1936	5778	316	1:18.2
1935	5093	277	1:18.3
1934	2320	158	1:14.6

The figures do not give an exact picture of Inspection, since the number of production employees fluctuates widely according to the assembly rate, while the number of inspectors is more static. However, it is interesting to note how inspection had to be increased during the war years, how it continued fairly concentrated in 1946 and 1947 before the accustomed efficiency of automobile manufacturing could be recaptured, and how it is now back to about the ratio of 1940 and 1941.

Control By Layout—Control is largely by what is called layout. This means the establishment of layout benches and tables in every major department where parts can be cut up for precision checking and where gages and fixtures can be checked carefully. Then a master layout room keeps a constant check on each departmental layout office. Every time a machine is repaired, the first part produced is taken to layout for proving before a go-ahead is given to the machine.

Each department in the factory has an inspection foreman and under him a number of inspectors who either have been hired as such or upgraded from workmen on the line. In addition, there are a number of trouble-shooters who can be dispatched immediately on special assignments. Inspectors are assigned to incoming shipments of Briggs bodies, to prevent bodies with paint damage from entering the production system. Some economies on this score might be realized by locating Packard inspectors in the Briggs plant, thereby avoiding truck shipments of bodies requiring touch-up or paint repair. Five inspectors are assigned to cars as they come off the two final assembly lines, and they must approve each job before it is transferred to traffic.

Another function of Inspection is the analysis of "technical service reports" sent into the factory from zone headquarters. These are received twice a month and cover a multitude of complaints, some serious, some trifling. Most frequent are complaints on paint.

Inspection Meetings—Where technical service reports disclose widespread or serious defects in shipped cars, the matter is discussed in monthly meetings which Inspection holds with top management. A solution to the trouble is arrived at and specific instructions issued for its correction.

Inspection techniques in manufacturing departments have been greatly simplified by the development of a number of new types of gages. A piston checking unit recently was installed at a cost of $11,000, effecting a saving of six men on inspection. Numerous air gages are used in various sections of the plant, and in the new automatic transmission department, installations of vacuum gages and manometers will facilitate accurate and speedy checking of parts.

The importance of modern high-production machinery

One of a number of transfer-type machines installed in recent years in the motor machining department is this 12-station Foote-Burt combination which automatically drills, reams, bores and countersinks valve guide and tappet holes in 8-cylinder blocks. Pushbutton control panel, with signal light indicators is in the foreground. Production rate is 62 per hour

to efficient automobile manufacture was never greater than it is today, in the face of what amounts to frozen high-level wage costs. In automotive plants, the machinery expert usually goes under the unassuming title of master mechanic and his is one of the most responsible of all key manufacturing jobs. So it is at Packard where Master Mechanic A. H. Grossman directs operations of a staff numbering at times as high as 900. Their work centers around supervision of all production equipment, the study and analysis of its cost, along with required tooling, and the determination of when to replace old equipment with new, what to recommend for purchase and how many.

Machine Inventory—Extent of the Packard machine inventory is shown in the following breakdown of the 4636 machines operated in the plant:

Balancing	30	Forging	43
Boring	87	Grinding	783
Broaching	85	Hammers	9
Centering	17	Honing	12
Chucking	50	Lapping	29
Clinchor	14	Lathes	496
Drilling	791	Measuring	16
Gear equipment		Milling	344
Burnishing	2	Molding	104
Chamfering	11	Polishing	81
Checking	4	Presses	241
Cutters	2	Reamer drive	72
Enveloping	5	Saws	79
Finishing	31	Screw Machines	196
Generators	68	Sewing	44
Grinders	4	Rolls	11
Hobbers	128	Lapping	59
Lappers	43	Testing	36
Quenching	10	Threading	19
Roughers	6	Tumbling	25
Shapers	84	Welding	83
Speeders	2	Miscellaneous	363
Testers	15		
Tooth rounder	1	Total	4636

These are almost all metalworking machines and exclude such things as heat treating furnaces, portable

One of the most sensational machine tools in the Packard plant, or any automobile plant in fact, is this hefty Cincinnati surface broaching unit which finishes top and bottom of heads for 8-cylinder engines. Trunnion-type fixture holds four heads, two in loading and two in work positions, each pair in reverse. After each stroke, the trunnion revolves 180 degrees, finished head being kicked off and sliding down chute to conveyor, the other one picked off by a fixture which reverses it and positions it for sliding into the trunnion jaws which are clamped hydraulically. Meanwhile the operator loads another head in the lower position. Production rate of 80 per hour can be maintained

tools and nonproductive equipment. Note particularly the large numbers of milling, drilling and grinding machines, as well as lathes.

Packard has pioneered in the use of large broaching equipment for finishing cylinder heads, and panrails and bearing supports of blocks, as well as in multiple-station transfer-type machines for drilling, reaming, tapping and countersinking of engine blocks entirely automatically. Other spectacular equipment includes twin-wheel hydraulically controlled grinders for rough and finish grinding of crankpins; a five-wheel grinding machine for finishing main bearings; a $300,000 Greenlee transfer-type machine for installation in the automatic transmission department; a $78,000 Davis & Thompson transfer unit for automatic machining of front wheel support forgings (this is not due until August and will replace old, slower equipment); seven Foote-Burt transfer-type machines for drilling and reaming operations on heads and blocks; a Gleason Revacycle unit for cutting teeth in differential side gears at the unheard-of speed of 75 pieces an hour.

Transmission Equipment—The new transmission department alone called for expenditure of approximately $7 million for equipment, 75 per cent of which will be new. Manufacture of standard transmissions will not be disturbed despite the large investment in processing the Ultramatic torque-converter unit. Tooling for the latter is based on production of 40 an hour, although at the start only 5 an hour will be built.

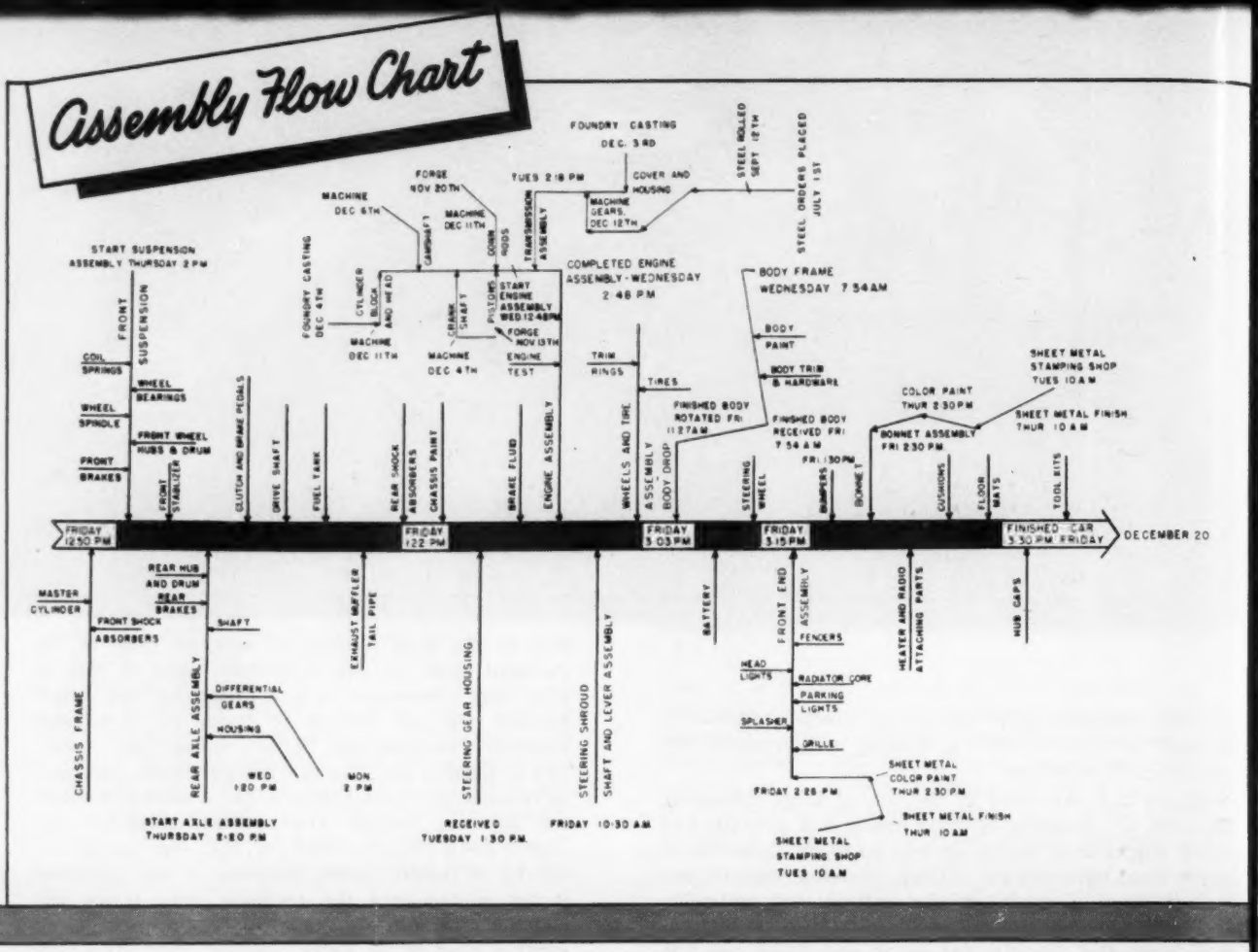
An interesting phase of the master mechanic's divisional operations is devoted to what is termed manufacturing research which works in conjunction with Purchasing in the continuous study of tool costs, with the idea of holding them to a minimum consistent with the maintenance of quality. A typical month's tool bill includes:

Special tools	$35,000	Oil and gas	48,000
Standard tools	35,000	Machine parts	26,000
Grinding wheels	18,000	Lumber	9,000
Misc. supplies	120,000		
		Totay	$291,000

While the latter four items are not tools, strictly speaking, they are carried in this category for purposes of checking and records. Manufacturing Research makes it a policy to have three separate sources on critical cutting tools, and also carries out regular tests on tools furnished by new vendors to see if they meet qualifications. This work carries over into such other fields as checking new processing methods, consulting with Engineering to forward preliminary data on new model manufacture to processing departments, analysis of tool costs of outside vendors, etc.

Important Arm—The chief metallurgist's section is an important arm of the Manufacturing Division, more so than the number of personnel involved would indicate. R. E. Van Deventer, chief metallurgist, has under his direction such activity as technical control of plating and painting processes and materials, chemical engineering, pyrometric laboratory, physical testing, foundry metallurgy and metallographic laboratory, as well as the selection and approval of all engineering materials. A high degree of reliance has been placed on metallurgists in recent years because of the critical shortage of steel and the necessity of making frequent deviations from specifications. The latter have run as high as 600 in a single month.

Packard for years has pioneered in new heat treating techniques and continues to install new equipment embodying the latest advances in the science. An example is induction hardening, first used on pearlitic malleable iron camshafts back in 1938 with an exceptional success. This type of hardening now has been extended



Complete flow chart showing dates and time at which various components start on their way to the final assembly line. This was prepared when only a single assembly line was being operated at a rate of 45 cars per hour. Bodies, of course, are assembled, painted and trimmed by Briggs Mfg. Co., then trucked to Packard for final trim, finishing and inspection, after which they move to the "body drop" as indicated

to transmission spline shafts, involving one of the most unusual automatic induction units ever built. The shafts are hardened in either three or four selective areas, depending upon whether the shaft is for the overdrive type of transmission or not, the latter having four hardened areas, three hardened to Rockwell C 58 and the other drawn back to C 40. The shaft, of S.A.E. 1141 steel, is traversed down through the induction coil, slowing at each of the spots to be heated and quenched, and on the upstroke the single softer area is drawn back as it passes through the coil. Production is 90 an hour.

More units are on order for induction brazing of brake bands on one element of the Ultramatic transmission and selective hardening of precision-fit gears. Consideration is being given to induction hardening of axle shafts.

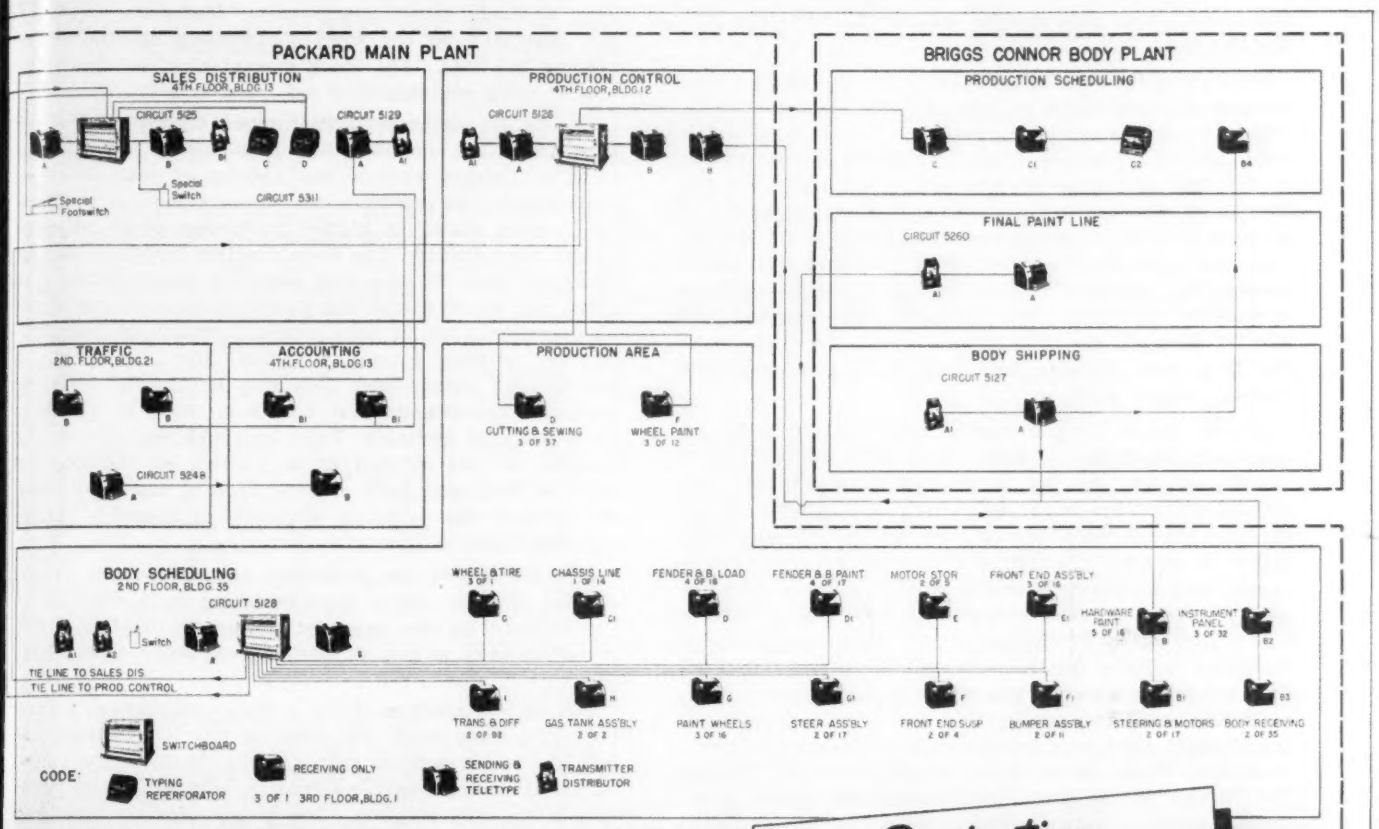
Packard was one of the first to use carburized and hardened gears, instead of the straight oil-hardening type. A continuous gas carburizing furnace for transmission and rear axle gears was installed in 1935, and since then two of the latest types of furnaces for this work have been erected. One is a pusher type, carrying double rows of gears stacked on vertical pins attached to carrier trays and is arranged so that one row goes through a 6-hr cycle and the other a 9-hr cycle by skipping trays at intervals on the long-cycle line, thus giving differential case depths from the same furnace.

This concludes review of the principal sections of the Manufacturing Division. Functions of the others—Plant Engineering, Traffic and Salvage—are evident from their identification and the subheadings on the organizational chart.

Engineering Questions—Paramount to the success of any motor car builder is its Engineering Division for it is here the planning must be made and the decisions concluded which may make or break the company two, three or five years hence. Shall bodies be wider? lower? roomier? shorter? shall engines have more horsepower? less weight? high compression? larger bore? What about axle ratios? transmission ratios? gross weights?

When these questions are answered there comes up the matter of cost. If you are going to make this change or that revision, what will it cost? How large an appropiation will you have to ask from management? Can manufacturing departments handle it? Will we be keeping up with competition? Or better still will we be ahead of competition? What about timing of new development?

Continually pondering questions like the foregoing, the Packard engineering staff, under the capable leadership of the veteran Colonel Vincent, vice president of engineering, and W. H. Graves, vice president and director of engineering, hopes its answers will be the right ones.



Production Teletypewriter System

Fathering a new car design is no simple matter. First must come the basic dimensional specifications, developed by engineers after consultation with the sales department, management and many other sources, and covering wheelbase, length, width, height, tread, center front wheel to dash, center rear wheel to dash (body space), seat positions, headroom, legroom, etc. These are roughed out in sketches and sent to the styling section where artists go to work on color renderings. Interminable conferences finally result in selection of the best artists' conceptions which then go to clay modelers who prepare quarter-size mockups built on wood frames. These are painted and even trimmed with exterior hardware. Perhaps a dozen of these will be made, each at a cost of around $3000 and requiring three weeks' time of three or four molders.

Stylists Go to Work—Briggs being the Packard body source, this company's own stylists go to work, independently with quarter size mockups for submission to the Packard management. Then it is up to the executive team to make a decision, and much hinges on their careful choice. Once determined, a full-size clay mockup of the design is made, usually requiring a couple of months and costing perhaps $16,000. Meanwhile a so-called "interior buck" is built up full size on a wood frame to show exactly how interior styling will appear.

All this time numerous refinements are being added, until finally the last O. K. is received and engineers can take off the lines and templates for working drawings to start the model into production. It is no trick at all to spend $2 million on a single model for engineering

PROCEDURE

1. A daily selection of sales orders equal to one day's production is turned over to the teletype attendants in Sales Distribution. By manual typing on circuit 5125 a five copy production order is produced at station A and simultaneously, a perforated tape, for automatic transmission, at station D. When not otherwise in use, stations B and C may be used for the same purpose. At the end of each day the five copy production orders and the associated perforated tape rolls are delivered to production control.
2. The daily quota of orders is given a final check in Production Control then turned over intact to the teletype office. The daily broadcast is started by placing the tape rolls, in numerical sequence, in the transmitter, station A on circuit 5126, and the orders are automatically and simultaneously reproduced on the reperforator, station C2, at Briggs. Following the broadcast the original perforated tape is cut into individual car orders and delivered with the associated 5 copy orders to Packard Body Receiving.
3. Production Scheduling, Briggs, uses order copy, received on stations C and C1, in the body scheduling and production process and delivers the individual order tapes to the final paint line. As the bodies reach Final Paint an attendant selects the matching filed tapes and by feeding them into the transmitter, station A1 on circuit 5260, reproduces the circuit. The used tapes are then delivered at intervals throughout the day to the Briggs shipping department. As the completed bodies reach Briggs shipping an attendant selects the matching tapes and broadcasts them, in truckload lots, from the transmitter, station A1 on circuit 5127, to the Packard stations on that circuit and Briggs Production Scheduling.
4. After the bodies are checked at Packard Receiving the matching production order copy and tapes are taken from file and placed directly in the body called for by the order. When those bodies reach Packard Body Scheduling the perforated tape and one copy of the order is removed from the body by a teletype attendant. The tape is then placed in the transmitter, station A2, and the order automatically broadcast to all stations on circuit 5128, preceded by a consecutive rotation number broadcast from transmitter, station A1. During that broadcast a typed copy is received at 5126B in Production Control and a new perforated tape at 5125C in Sales Distribution.
5. Sales Distribution uses the new tape in a final broacast to Traffic and Accounting over circuit 5129 and alternate circuit 5311. The production order information is sent automatically and the balance of information on the original sales order is sent manually from station A on circuit 5129, and by use of a switch, from station 5125B over circuit 5311.
6. A report of cars shipped is sent, by manual operation, from Traffic to Accounting, over circuit 5248.

design and test, plus maybe another $100,000 for just the styling.

Cost goals have to be established by the Engineering Division on new model engineering changes as much as two years in advance of production. Tool costs for each item, plus the piece cost, are estimated and submitted to the Manufacturing Division for its estimates. If the two do not jibe pretty closely, then the engineers have to go back to their drawing boards and redesign. The recent case is cited of an instrument panel change which involved an increase in piece cost of 27 cents plus tools amounting to $4000. The proposal was rejected and started through the mill again, wiith the final result the piece cost increase was held to 0.6 cent and tools running to only $200.

A new engine project requires the same painstaking care and interchange of ideas, along with the building of sample engines and six months of testing them. Bill Graves thinks his boys, with their background of experience, could whip out a new design in something under 24 months. Timing is a critical factor on a new engine, and naturally is closely related to productive capacity. When the war ended in 1945 it was decided to tool a new series of engines rather than enlarge manufacturing facilities for the power plants in production before the war. The job was completed in about a year, inasmuch as it did not involve any radical departures, the straight-eight type being continued with major modifications. Three series of eights now are built—135 hp, 150 hp and 160 hp. There is a considerable degree of interchangeability between them, permitting amortization of tools over a larger number of units.

What of Tomorrow?—What about Packard Motor Co. in the years of tomorrow? There is no one better equipped—or more determined for that matter—to answer that question than George Christopher who has seen and helped Packard grow enormously in stature since the day he left his Ohio farm and put on the automotive harness again. He foresees the day when production will be pushed to 200,000 units yearly (it should touch an all-time high this year of 130,000 if hopes are realized), providing greater penetration into areas which cannot sustain dealerships at the present level of output.

The drive to reduce manufacturing costs will be unabated in the years ahead, even though little prospect is seen of a return to prewar price levels for motor cars. High labor rates and solid union pressure behind them make this too tough.

Packard is not likely to move back into the truck field. There was an opportunity to cash in three years ago, when the truck market literally was starved for vehicles. There was an engine ready which would have been a dandy truck power unit. Materials shortages and indecision on the part of management resulted in missing the boat. The truck market now is well on the way to being glutted.

Despite an aging production plant tightly girdled by a swollen city, complicating problems of quick shipment of finished cars to say nothing of materials and parts intake, the company has ample space and facilities for moving ahead to higher production goals in component manufacture. The body problem is not so simple. Trucking from Briggs, even over the short distance, is costly and inconvenient. One answer might be to establish an assembly plant in some outside location—perhaps the 500-acre proving ground at Utica, Mich., would be a logical first choice—and then ship knock-down chassis, engines, transmisions and bodies or body components there for final assembly. Parts and subassemblies can be trucked or rail shipped at a fraction of the cost of finished cars, and both General Motors and Ford have ably proved the economic soundness of assembly plants divorced from central manufacturing.

Manufacture of the distinctive new Ultramatic transmission will be pushed for everything it is worth. At the moment no one has anything in the field just like it, so Packard enjoys at least a temporary competitive jump.

Merger Speculation—It is a trite observation around Detroit to say that the road of the independent car builders in competition with the Big Three is too rough to travel alone, that consolidation with other independents is the only solution. The gossip peddlers have had Packard in a dozen combinations in as many years. Actually there was a study made of the possibilities of integrating Packard and Nash operations two years ago. It fizzled. Something like it could come up again, if the U. S. economy starts to rock badly.

Meanwhile the 50-year culmination of a dream which thrilled James Ward Packard as he chugged through the dust in his one-lunger at the turn of the century has been even more brilliant than he could foresee. Immense fortunes were created, for those who believed in him, and for their descendants. Production of 1,200,000 vehicles, good-paying jobs for tens of thousands, vital contributions to the military successes of two World Wars, rewards to 116,527 current stockholders, one of the oldest and most respected names in motordom, a productive plant geared to the needs of today, and tomorrow—all these are gold-starred elements of the Packard story, 1899-1949.

Business Leveling Off

Present trend may be followed by pickup in second half, purchasing agents say

TREND of business is to level off for the present, with a possible pickup this summer or early fall. This is the opinion held by the National Association of Purchasing Agents' Business Survey Committee. Much hesitancy in buying is noted, with markets being watched carefully for a settling of prices reflecting recent basic material declines.

During April, a slight improvement in business, perhaps seasonal, developed. Production increases were reported by 19 per cent of the committee members, the largest number moving upward since October, 1948, and 48 per cent continue to maintain previously reported production schedules.

Some Orders Gain—Order backlogs also increased with 23 per cent showing some betterment in April and 40 per cent holding even with the previous month. A bright spot in the survey for April is the apparent increase in productivity with 76 per cent reporting increased man-hour production. Several reported that production on a 40-hour week equals the previous 45-hour week output.

The buyers' market, which had been observable since November, arrived in force during April. Most industrial commodities are down, with strong indications of further declines, the report said. Supply, generally has caught up with demand and in many instances has passed it. Nonferrous metals, which carried the most pronounced declines, are incorporated into so many other materials and fabricated items that a large segment of the industrial materials list will be influenced.

Inventories Decline—Purchased industrial inventories took a sharp drop in April, as 60 per cent reported declines. Purchasing agents are taking a shorter position on inventory, working off higher-priced materials and adjusting stocks to lower operating levels. "Hand-to-mouth to 60 days" is the predominant purchasing policy. Immediate availability of many materials, shorter commitment schedules on others, and the general price softening permit short-range procurement programs.

Ducommun Marks Centennial

ONE HUNDRED YEARS of progress were marked by Ducommun Metals & Supply Co., Los Angeles, western steel distributor, in centennial celebration on May 7.

According to Wayne Rising, general manager, some 18,000 personal invitations had been sent to Ducommun suppliers, customers, and employees. The commemoration was centered on an "action open house" and directed tour of the company's general offices and main warehouse.

Founded in Los Angeles in 1849, Ducommun is one of the oldest companies in the West. Only 13 other California firms, of any type, will reach their centennials this year.

Form Joint Mobilization Board

JOINT United States-Canada Industrial Mobilization Committee has been established, following a series of discussions that began last June.

The committee will consist of John R. Steelman, acting chairman of National Security Resources Board, and Donald F. Carpenter, chairman of Munitions Board, for the U. S.; and Harry J. Carmichael, chairman of Industrial Defense Board, and S. D. Pierce, associate deputy minister of the Department of Trade and Commerce, for Canada.

The committee will exchange information and co-ordinate the views of the two governments in connection with planning for industrial mobilization in the event of an emergency.

Sheet Metal Distributors Meet

NATIONAL Association of Sheet Metal Distributors will hold its spring meeting May 9 and 10 at the Deshler-Wallick Hotel, Columbus, O.

Speakers at the convention include Edward V. Hickey, director of production, National Security Resources Board, who will discuss the board's functions; Robert M. Nelson, Armco Steel Corp., Middletown, O., who will analyze the outlook for steel; John Phillips, Stelwagon Mfg. Co., Philadelphia, who will outline the functions of the wholesale distributor; W. B. White, Smith Bros. Hardware Co., Columbus, whose subject is "Credits and Collections"; James H. Davis, Ohio State University, who will speak on wholesale distribution; H. H. Maynard, Ohio State University, who will examine business conditions; and W. P. Tracy, Tracy-Wells Co., Columbus.

Urges Stockpiling Restraints

DAMAGING economic chains would be placed upon this country's productive machinery were the United States to stockpile too many planes, bombs and battleships, Charles E. Wilson, president, General Electric Co., told members of the American Society of Naval Engineers at the annual banquet in Washington, Apr. 29. He said "almost the only thing that is worth stockpiling" is "know-how," the one commoditiy we have in great abundance.

Warning that the only security that has any meaning today is one in which economic stability and productive capacity are the keystones, he said the armed services should receive only what they need for combat.

CALENDAR OF MEETINGS

May 9-10, National Association of Sheet Metal Distributors: Spring meeting, Deshler-Wallick Hotel, Columbus, O. Association headquarters are at 505 Arch St., Philadelphia.

May 9-11, Liquefied Petroleum Gas Association: Annual meeting, Palmer House, Chicago.

May 9-12, American Mining Congress: Coal convention and exposition, Public Auditorium, Cleveland.

May 10-13, American Management Association: National packaging exposition and conference on packaging, packing and shipping, Municipal Auditorium, Atlantic City, N. J. Association headquarters are at 330 W. 42nd St., New York.

May 11-13, National Welding Supply Association: Fifth annual convention, Hotel Gibson, Cincinnati. Association headquarters are at 505 Arch St., Philadelphia.

May 12-13, Instrument Society of America: Fourth annual spring meeting, Royal York Hotel, Toronto, Canada.

May 12-13, Rail Steel Bar Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

May 13, American Institute of Electrical Engineers: Conference on electric equipment for materials handling bridges, Hotel Cleveland, Cleveland.

May 15-19, National Association of Credit Men: 53rd annual credit congress, Convention Hall, Atlantic City, N. J.

May 16-18, Industrial Furnace Manufacturers Association: Annual meeting, Hotel Cavalier, Virginia Beach, Va. Association headquarters are at 420 Lexington Ave., New York.

May 18, Bituminous Coal Research: Annual meeting, Columbus, O. Agency's office is at 912 Oliver Bldg., Pittsburgh.

May 19-21, Society for Experimental Stress Analysis: Spring meeting, Hotel Statler, Detroit. Society address is Box 168, Central Square Station, Cambridge, Mass.

May 19-21, Automotive Engine Rebuilders Association: Annual convention, Baltimore. Association headquarters are at 415 N. Capital Ave., Indianapolis.

May 23-24, American Steel Warehouse Association: 40th annual meeting, Ritz-Carlton, Atlantic City, N. J. Association headquarters are at 442 Terminal Tower, Cleveland.

May 25-26, American Iron & Steel Institute: 57th general meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.

May 29-31, Conveyor Equipment Manufacturers Association: Spring meeting, The Homestead, Hot Springs, Va. Association headquarters are at 1129 Vermont Ave. N.W., Washington.

May 30-June 1, Metal Treating Institute: Spring meeting, Chateau Frontenac, Quebec, Canada. Institute headquarters are at 420 Lexington Ave., New York.

May 30-June 10, Canadian International Trade Fair: Toronto, Ont., sponsored by the Canadian government.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Congress expected to approve appropriations for European recovery substantially as recommended. Record shows funds build U. S. prestige, bring business to America

SUCH quibbling as features the congressional hearings over whether to appropriate a smaller amount for European aid than the recently authorized $5,580,000,000 is largely academic. Indications are that if a cut is decided upon by Congress it will be of the moderate proportions suggested by President Truman.

Most legislators share the view of the executive department that our assistance to Western Europe is paying off in terms of building our prestige and influence in the cold war with Russia. Further, they are satisfied that in this program, unlike post-World War I when we invested billions in foreign bonds which later proved worthless, we are getting something in return for our money.

Endorsed by Business Groups—How business feels is reflected by actions of the National Association of Manufacturers and the Chamber of Commerce of the United States in approving the recovery program in principle. Aside from patriotic considerations, the reason for the favorable opinion of manufacturers, farmers, bankers, exporters, etc., is that, by putting dollars in the hands of Europeans under the reconstruction program, we are getting a lot of business we would not otherwise get.

Here is the breakdown, by countries of origin, of the Economic Cooperation commodity procurement authorizations for the first 12-month period—April, 1948, through March, 1949, in millions:

$2,821.5	United States
699.0	Canada
442.0	Latin America
188.4	Participating countries
208.4	Other countries
$4,359.3	Total

Chain Reaction—Not only do we get this direct business from ECA authorizations but the authorizations to Canada, Latin America and other countries give these countries dollars which they can spend in the United States. So altogether a substantial amount of business and employment in the United States derive from the European reconstruction program.

Of the authorizations for the first 12-month period, $578.4 million were for United States machinery and vehicles, of which $401.1 million were for machinery and equipment and $177.3 million for vehicles and equipment. The breakdown, in millions:

Machine tools $50; other metalworking machinery $39.8; construction and mining equipment $61.1; electrical machinery and apparatus $38.7; engines and turbines $3.9; other industrial machinery $31.7; agricultural machinery excluding tractors $40.1; agricultural tractors $32.0; other tractors $13.9; motor vehicles, parts and accessories $91.3; aircraft, parts and accessories $44.8; other transportation equipment $41.3.

During the first 12-month period authorizations for commodities to be supplied from the United States included $304.5 million of nonferrous metals and their products and $117.7 million of iron and steel products.

Industrial Equipment Gains — In the first 12-month period authorizations for food, fuel, fertilizer and raw materials and semifinished products predominated. These items will loom smaller from now on. Finished products of industry will be shipped to Europe from here on on a much larger scale; the increase over the first year will be at least 50 per cent.

ECA Administrator Paul G. Hoffman says procurement of U. S. machinery and equipment in the second year should be at least $650 million compared with $401.1 million in the first. Procurement of United States machine tools in the second year should be around $75 million compared with $50 million in the first.

Orders for industrial equipment will continue to be placed by European consumers so that only such companies as have European representation will benefit substantially from this growing business.

Germany Wants Machinery—Incidentally, the most fruitful market in Europe for American machinery now is Bizone Germany due to removal of previous uncertainties arising out of the plant dismantlement program. From substantially zero, authorizations for German procurement of American machine tools came to $3.2 million in the first quarter of 1949. There will be a further stepping up since Bizone users are reported as ready to order $56 million of American machine tools in the second quarter if they can get permits.

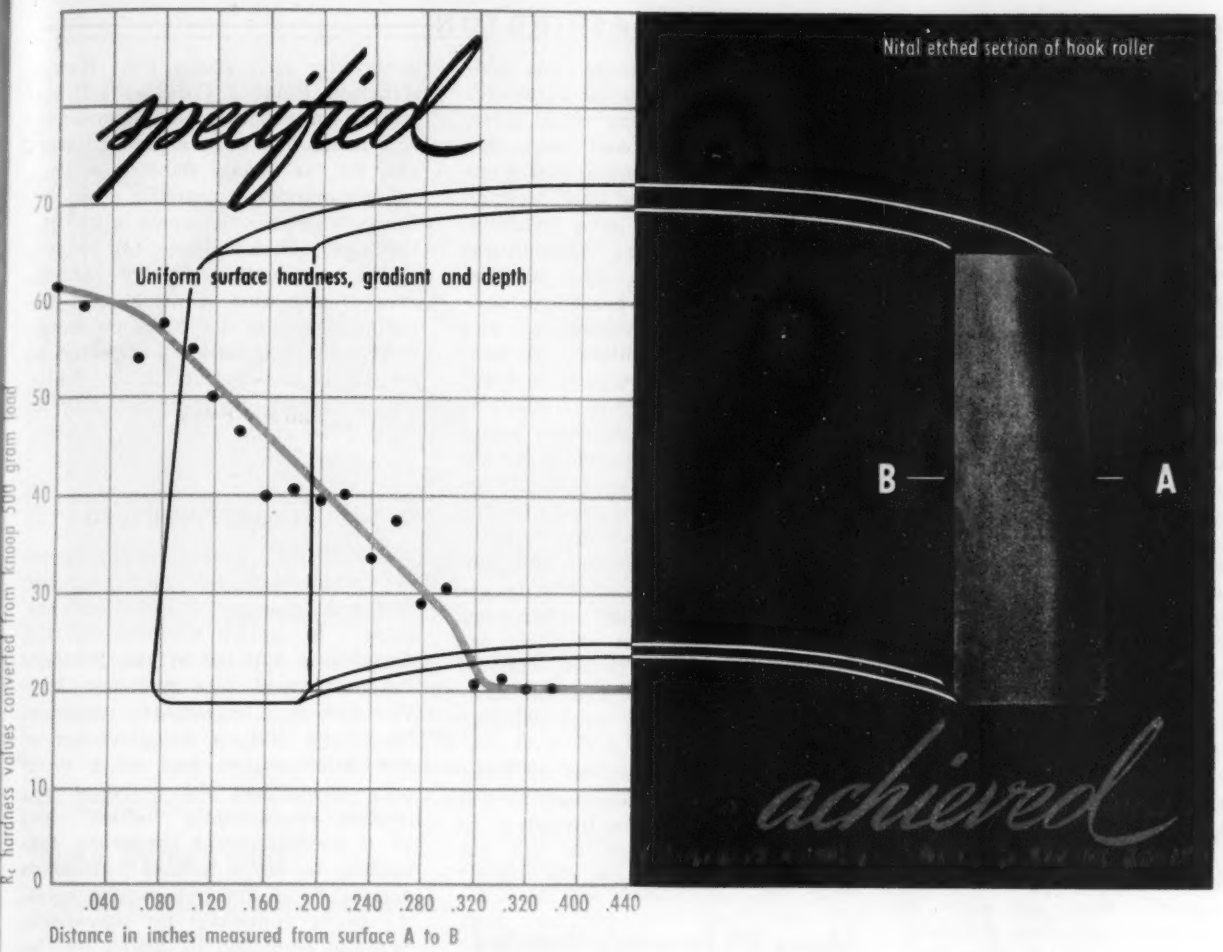
Ask "Point Four" Guarantees

INTERDEPARTMENTAL committee set up to bring into being the Truman Point Four program (aimed at helping people "all over the world" to an improved plane of living) has decided to ask Congress to approve some form of guarantee by which private business men will be encouraged to invest money in foreign enterprises on a larger scale. Under the guarantee sought, Uncle Sam would reimburse American manufacturers, bankers, exporters, etc., for losses sustained as a result of war, damage by riot or civil strife, and losses from expropriation actions by foreign governments.

The State Department will seek to get agreements from other countries on the lines of the treaty of Friendship, Commerce, and Navigation negotiated with Italy in February of 1948 and which defines the exact treatment which each nation will give to the citizens of the other. In particular, State is to push its drive for assurances from Latin American and other nations that fair compensation will be made to American owners in the event their plants or other assets in such countries should be expropriated. Such assurances, bolstered by a guarantee that our own government will back them up with cash payments if necessary, are regarded as essential to attract more American money into other countries.

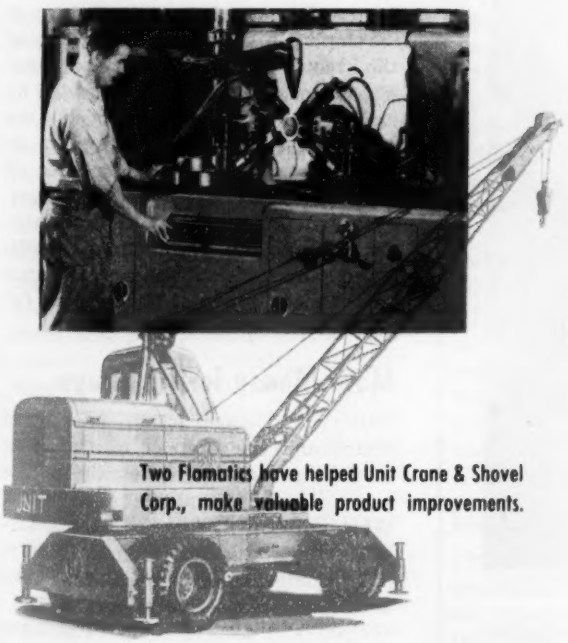
Decision also has been arrived at that the function of the government in pushing the Point Four program should be along advisory and service lines and that actual business dealings under the program should be left to private enterprise. Under discussion is a plan to set up a central clearing house in Washington for all information of use to American business men in investing funds in foreign countries; to implement this proposal a special appropriation from Congress would be necessary.

Another decision—which probably will arouse some controversy in Congress, and cause complaints from time to time from affected manufacturers—is to import foreign goods on a far larger scale than at present to provide foreign interests with dollars



by flamatic selective surface hardening

Flamatic set up for hardening hook roller



Two Flamatics have helped Unit Crane & Shovel Corp., make valuable product improvements.

The etched section and the graph plotting Rockwell "C" hardness vs. distance from the surface of this 5" OD hook roller, Flamatic-hardened by Unit Crane & Shovel Corp., are convincing proof of Flamatic performance. Material: AISI-8750 steel tubing. Production rate: 30 parts per hour. Distortion: so low that no machining is required after heat treatment. Unit Crane & Shovel hardens many other parts on their two Flamatics, and reports, "We can very definitely state that our product has greatly improved since this (Flamatic) installation was made, particularly with reference to the extended life of a 16" drum gear . . . the life of which has been extended 50%."

Flamatic hardening uses high temperature flames and exclusive electronic temperature control which enable you virtually to **blueprint the desired hardness pattern** (on parts up to 18" OD or shafts up to 24" long) and **get what you want** automatically, uniformly, with exceptional economy. Write today for case history booklet publication No. M-1658, or better still, send in your parts for analysis and quotation.

flamatic

THE CINCINNATI MILLING MACHINE CO

Cincinnati 9, Ohio, U.S.A.

CINCINNATI

to buy our products. This part of the work already has a good start as a result of Commerce—State Department efforts to interest foreign business men in entering United States home markets.

Export Controls Eased

REMOVAL from export control of some 500 additional commodities, after concentrated study over a period of two months, is a fine gesture to the Russians and their satellites and it should help them in filling their peacetime needs. But it is not going to give them any direct military assistance.

Predominating among the freed items are meats and other foods, drugs and pharmaceutical preparations, certain coal tar dyes and other derivatives; certain chemicals, dental supplies, clocks, watches, jewelry, buttons, glass products, lumber, vegetable oils, seeds, paper and paper products, cotton manufactures, and others.

But a lot of products of the metalworking industry now are free of control and may be shipped anywhere in the world without a validated license. Here are some of them: Bathtubs and other plumbing fixtures; sheet metal storage cabinets, bins, shelving, lockers, tables, kitchen utensils, hospital utensils (except enameled); metal beds, bedsprings, and other metal furniture; fire resistant safes and vault doors, bank vaults; office and store fixtures; cooking and heating stoves except electric; a host of hand tools as screw drivers, saws, axes, hatchets, files, hammers, etc.; agricultural hand tools as rakes, hoes, shovels, scoops, etc.; builders' hardware; electric household refrigerators and home freezers; lighting fixtures, agricultural machinery such as drills, seeders, plows, harrows, planters, harvesters, hay presses; cash registers; scales; sewing machines; certain scientific and professional instruments and parts; musical instruments, and others.

Machine tools and other strategic industrial equipment continue to require licenses for export to European countries and certain of their dependencies, but, as before, can be shipped to other countries, as Canada, Latin America, etc., without licenses.

In general, the removal of these additional items from export control is hailed as "an open invitation to American businessmen to get out and do business all over the world."

Myers Bill Favorably Reported

THE Myers bill to encourage development of a private tin smelting industry by authorizing the Reconstruction Finance Corp. to sell imported tin concentrates to domestic consumers has been reported favorably by the Senate Banking & Currency Committee and now is on the Senate calendar. It would allow the RFC to "sell low-grade tin concentrates to private industry at no greater loss than it would cost the RFC to process it." First customer, if the bill is passed, is expected to be the Vulcan Detinning Co., which has a new process for recovering tin from low-grade Bolivian concentrates.

Oppose Science Foundation

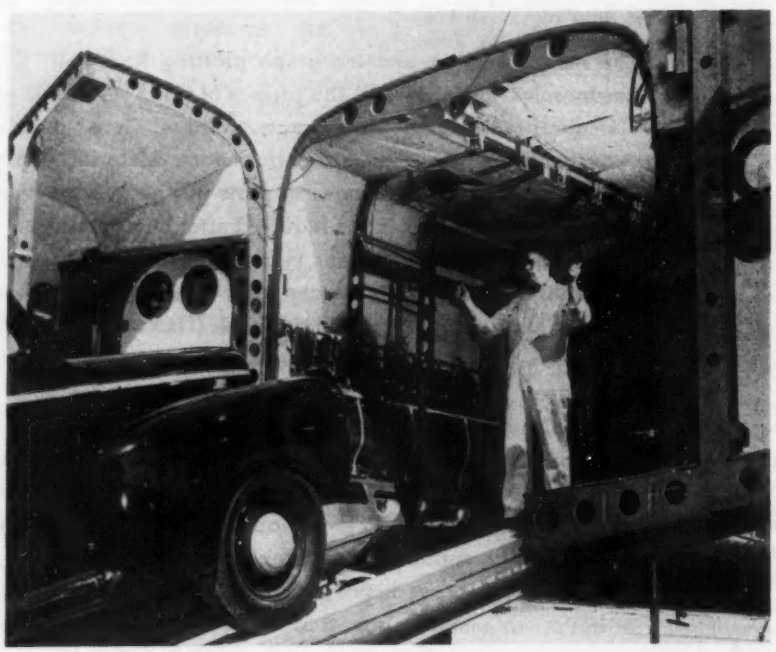
ALTHOUGH most manufacturers have endorsed the Senate-passed National Science Foundation bill, subject to certain amendments, the measure is opposed by the National Patent Council. Its president, John W. Anderson, president, Anderson Co., Gary, Ind., a manufacturer of windshield wipers and other products, condemned the proposed legislation as distinctly "leftish"—and as a deep-laid and persistent conspiracy to use a science foundation act as "a destructive instrumentality to be controlled by subversionists and employed to disable our industry."

Summarize Hoover Reports

TO FACILITATE the aim of the recently-organized Citizens Committee for Reorganization of the Executive Branch of the Government in developing a public understanding of the recommendations of the commission of the same name headed by ex-President Herbert Hoover, the commission now is working on an overall summary of the reports of its various task groups. This summary will set forth all the recommendations of the task groups, with enough background in each instance to permit a grasp of the reasons for the recommendations.

More Money for Highways

HIGHWAY construction in the 48 states and the District of Columbia in 1949, according to a survey of the American Road Builders' Association, Washington, will come to $1,265,692,000, which figures include federal aid. Comparable figures for 1948 and 1947, respectively, are $1,128,344,000 and $853,057,000. The 1949 program calls for 34,271 miles of state and federal aid highways which break down into types as follows: Portland cement concrete 1556 miles, bituminuos mixes and treated types 19,842 miles, other types 10,508 miles.



NEW FLYING BOXCAR: The Air Force has accepted the first production model of the Fairchild C-119 packet, latest of the flying boxcar line and carrying substantially greater engine power than earlier models. Above photo shows staff car boarding the plane via ramp which is provided with the plane. Payload is 9 tons or more with a cruising range of 2000 miles. Air Force has ordered 136 of the new model

LOCOMOTIVES FOR INDIA: The first 36 of 100 wide-gage passenger locomotives ordered from the Baldwin Locomotive Works by the government of India are loaded aboard ship at Philadelphia. They will make up the entire cargo of the S.S. PETER DAL in what is believed to be one of the largest shipments of locomotives ever made in a single vessel

Trade Winds Fair?

Western Europe tests business weather, seeks new markets at industrial exhibitions

TRADE wind direction is being tested by Western European nations at industrial fairs and exhibitions. Although the expositions give barometer readings showing troubled economic horizons, possibilities for improving the business weather have also been revealed.

Italy's Milan Samples Fair this year, for example, established an all-time record for size and attendance and indicated the growing importance of the Italian market which now is in better financial condition and has a ravenous appetite for capital goods. The Paris International Air Show last week emphasized the gains and potentialities of the commercial aviation industry, a field which since the war has been almost completely dominated by the United States and Great Britain. Western Germany's New York product exhibit last month served as spadework in the task of re-establishing German-American commerce. Britain's industries fair, which continues until May 13, may serve as a needed impetus to lagging industrial sales (STEEL, May 2, p. 63).

Italy

MILAN'S exposition had official displays from 22 countries this year, compared with 18 in 1948, a record until then, and four in 1947. Of the 6000 private exhibitors, 1600 were from nations other than Italy. In 1948 the 5600 exhibitors included 1452 from outside Italy.

British and German makers of machine tools and other capital equipment dominated the foreign contingent, largely because Italy has a favorable balance of trade with England and Western Germany as a result of heavy agricultural exports during the past 12 months.

German machinery orders in Italy exceed $2 million. Major supplier of Italy's capital equipment, however, is the United States, because of Marshall plan aid. The Economic Cooperation Administration had an exhibit at the fair pointing to the advantages of American technical "know-how."

Italy's capital equipment needs for the next several years will likely come from her own plants or from these three nations because currency difficulties bar out all other possibilities.

France

FRENCH aircraft industry, nearly extinct at the end of the war, showed its resurgence last week at the 18th Paris International Air Show.

Featured at the exhibition were the new Breguet Skycoach transport designed to carry 100 passengers in tourist class and the 73-ton Armagnac, another transport. The Armagnac was built to the order of Air France, the French national airline, for trans-Atlantic passenger flights with 60 passengers. It is powered with four American-designed 3500-hp Pratt & Whitney engines. These two aircraft will aid in France's bid to improve her position in the world commercial aviation field. Two new French-built jet fighter planes, the S.O. Espadon and the Dassault Ouragan, were on exhibition.

Other nations represented at the show were Britain, the U. S., Belgium, Switzerland, Italy, the Netherlands and Czechoslovakia, which sent a few sport planes. Britain's principal exhibit was a model of the new Vickers Viscount transport, a turboprop airliner. American manufacturers were represented by exhibits from Lockheed, Douglas, Bendix, Aerojet, Beech, United Aircraft, Boeing and Consolidated Vultee.

Western Germany

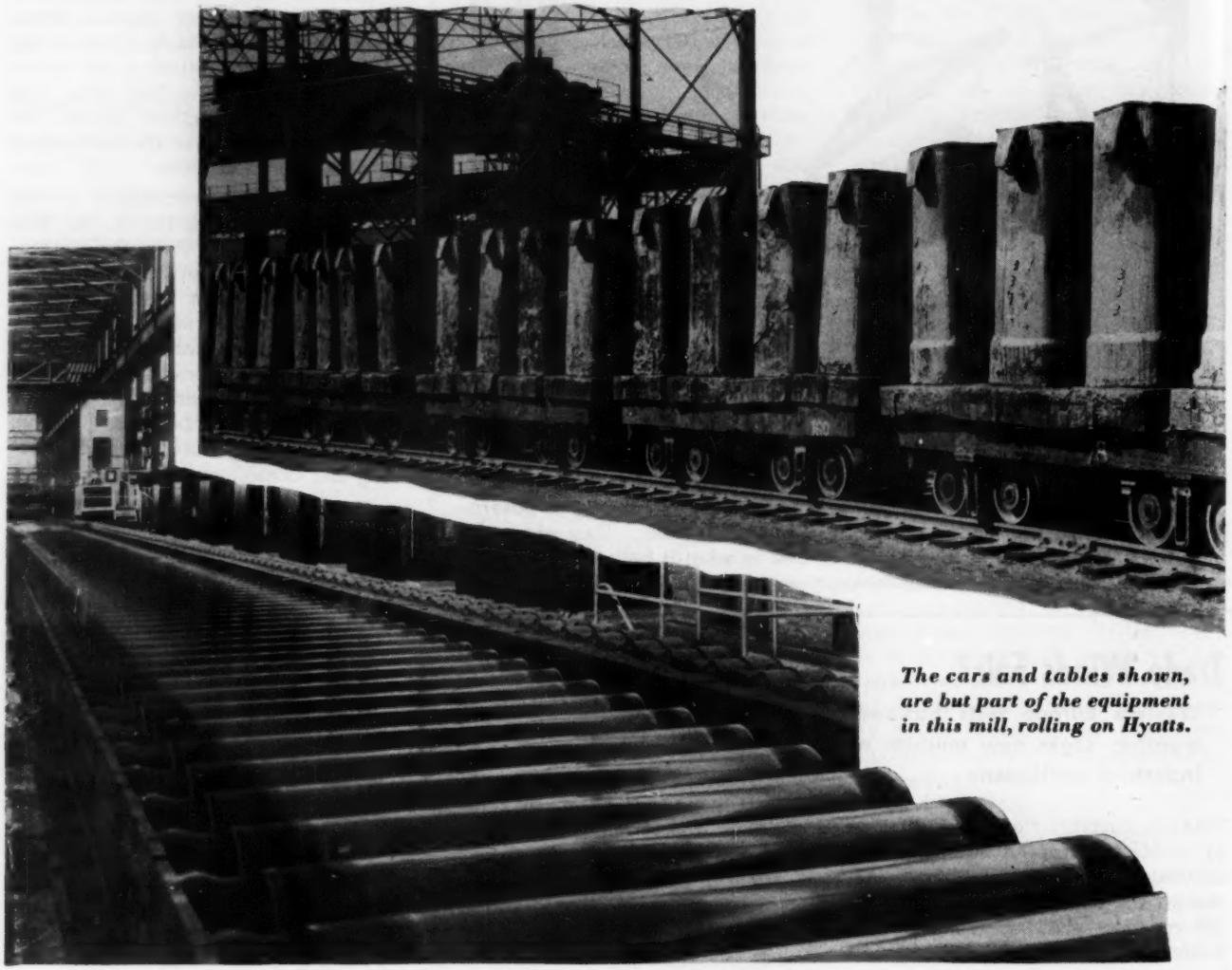
WESTERN Germany's product exhibit in New York last month was a preliminary bout in a battle to regain American markets. The Ruhr in normal times has always been dependent upon trade abroad to absorb part of its output. With production rising in the area, German industrialists must examine every possibility for overseas business.

The production of automobiles reached a new postwar high in March, with 12,101 units turned out, an increase of 18 per cent over the February level. Total car production in the first quarter was 32,307, 30 per cent above the 1948 fourth quarter level and nearly half of last year's total output. Production in Bizonia is now 89 per cent of 1936 output. Exports, valued at $86.8 million in March, also reached a new postwar high. February exports were valued at $78.7 million. Some German exporters are protesting that the present exchange rate of 30 cents to one mark is too high.

Steel rationing is slowly dying, and the formal allocations system may be discontinued by the middle of the year. Some types of steel, particularly tinplate, are still very short; no tonnage of this product will be available until 1950 for canning.

Reorganization of the Ruhr steel industry is still proceeding at a snail's pace, partly because of the present political uncertainties which are taking up most of the Allied authorities' time and energy. The nature of compensation to the former private owners of the companies involved is the current stumbling block.

HYATTS...OF COURSE

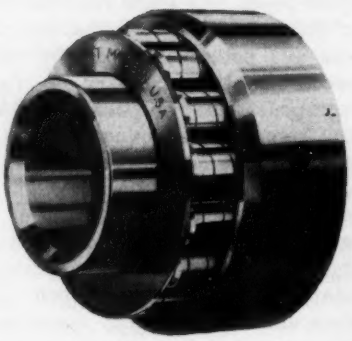


The cars and tables shown, are but part of the equipment in this mill, rolling on Hyatts.

IN the largest steel mill in the east, employing the most modern methods and equipment for economical and speedy production—you will find Hyatt Roller Bearings, of course, on the job.

Having served so well for so many years Hyatts have earned their reputation as the preferred roller bearings for steel mills.

On new equipment always specify Hyatts and on change-over jobs use Hyatts to be sure of outstanding production performance. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

General Motors averages $20 million in net sales for each working day of first quarter, realizes net income of 10.7 per cent of sales. Forty-one million dollars paid in bonuses

DETROIT

IT IS a tidy little business which can show net sales of $20,354,000 each working day and realize income of $2,171,000 or 10.7 per cent thereon. That is exactly what General Motors Corp. recorded for the first quarter of this year, the best three-month period dollarwise in the history of the corporation. Sales value was at an annual rate three times the 1936-41 average—over $5 billion—and about 18 per cent ahead of a year ago. Expressed in units, there were 560,542 cars and trucks sold, or 8897 for each of the 63 working days in the quarter.

Income was equivalent to $3.04 per common share, after deducting dividends on preferred stock, and out of this a dividend of $1.25 was declared, comparing with 75 cents for the first quarter of last year. This record-breaking pace was maintained in the face of model changeovers by Pontiac and Chevrolet which, although effected in minimum time, still resulted in a perceptible slackening of the production tempo. All indications point to a second quarter which will eclipse the first by a wide margin, since every GM automotive division is pressing for all it is worth and no letup is anticipated before July, if then.

The record demonstrates strikingly what high volume means in terms of profits for automobile manufacturers integrated as nicely as GM. The danger lies in popular misinterpretation of the figures and misunderstanding of how they were possible. Union propagandists can be expected to make the most of the opportunity to flay the profit system, as though it were criminal for business to earn handsome returns in periods of flush business. Actually, it would be more criminal not to realize such earnings.

Net working capital of GM continues to grow, gaining $100 million in the first quarter to better than $1192 million. Interestingly enough, in contrast with many other lines of business, inventories also jumped sharply from the end of last year, being up 13.2 per cent to over $890 million.

Bonus Melon Cut—A juicy bonus melon was cut out of GM's $440 million profits for 1948, awards going to 3799 and aggregating close to $41 million. Another $8 million was carried forward into the bonus reserve. The awards will comprise 141,798 shares of common stock and the balance cash. They will be delivered in annual installments over a period of not more than five years if earned out in accordance with the terms of the bonus plan which was established in 1918 and revised in 1947. Currently, the maximum amount is 12 per cent of net earnings after deducting 5 per cent on net capital.

Bonuses are determined by a committee made up of five directors who are not themselves eligible for bonuses. For 1948 the committee determined the minimum salary rate for bonus eligibility should be $650 per month, although a number of awards were made to personnel receiving less than this figure, just how many it is not revealed. As mentioned, the total number of awards was 3799 which is about 1 per cent of the 380,329 salaried and hourly rated average employment for last year (current employment is up to 396,261).

Payments Average $10,800—If the number of participants is divided into the total to be disbursed, an average bonus figure of $10,800 is arrived at; naturally those in the higher brackets receive proportionately higher bonuses, but it is readily apparent the payments are no puny sums.

Each award of $1000 or less is to be paid at once, while amounts over that figure will be paid in annual installments of 20 per cent or $1000, whichever is greater, the first such installment now and the remaining installments in January of each succeeding year. The bonus committee decided that the first two installments of any bonus should be half in common stock and half in cash, with remaining installments entirely in cash. There remains in the bonus reserve well over $9.5 million, and everything points to an even greater distribution in 1949.

The windfall brings a nostalgic sigh from former GM executives who used to participate in lush bonuses back 20 years ago. Many of them could kick themselves for having disposed of GM common received in bonuses of those days.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

January	**445,092**	**422,236**
February	**443,734**	**399,471**
March	**543,711**	**519,154**
April	**563,300***	**462,323**
May		**359,996**
June		**454,401**
July		**489,736**
August		**478,186**
September		**437,181**
October		**516,814**
November		**495,488**
December		**514,337**
12 mos.		**5,549,323**

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Apr. 16	**131,821**	**104,761**
Apr. 23	**141,227**	**107,093**
Apr. 30	**133,714**	**102,967**
May 7	**130,000**	**84,684**

Estimated by Ward's Automotive Reports

New Buick Coming

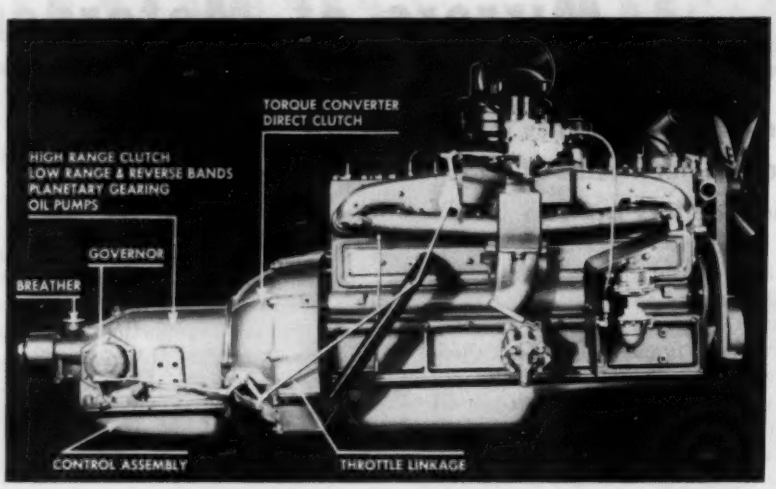
FINAL tooling details of the Buick special series are being completed and indications are that a delay of about 30 days has been encountered in this program. First plans were to have the job in production by July, now it looks like August.

Tooling releases are anticipated for new General Motors "C" bodies to be used by Oldsmobile, Cadillac and Buick in their 1950 models, slated for year-end production. Here again, however, the bulk of the project will be handled directly in Fisher Body Plant 23 here.

Tool, Die Business Slow

TOOL and die trade continues deep in the doldrums, with even the larger shops finding pickings very lean and prospects for this summer still dimmer. There is a small amount of Studebaker work distributed around the city, in connection with new models which this manufacturer will introduce later in the year. Nash likewise has placed some die jobs locally, presumably for an entirely new

(Material in this department is protected by copyright and its use in any form without permission is prohibited)



ULTRAMATIC DRIVE: Principal elements of the newly announced Packard no-shift transmission are shown here. A new torque converter for acceleration is combined with positive mechanical drive for cruising to make the unit responsive, positive and flexible

light-weight low-price car. Details are vague, although opinion leans to the belief Nash is planning a model smaller than the present 600 series, possibly shooting for the much-discussed $1000 field.

Incidentally, James D. Mooney, chairman of Willys-Overland and until recently president of that company, told a New York audience recently the $1000 passenger car could be built readily if there were a realistic approach to taxation of motor vehicles. The average car, he said, carries a direct and hidden tax burden of well over $400, in the face of which it is hardly possible to build a model to sell for $1000 and still cover labor and material, plus dealer margins.

Yearn for Annual Models—Some sections of the tool and die trade would like to see an early return to former policy of yearly model introductions simultaneously by all producers along with a national automobile show. Somewhat selfishly perhaps, they argue this arrangement would stimulate competition and inject a little needed pep into the die business. This may be already under way. For one thing, the public is now getting choosy over new car purchases and is beginning to wonder whether new cars now being offered are 1948, 1949 or 1950 models. Actual dating of models has become a little hazy. Chrysler, for example, having dropped the yearly tag altogether. The Ford series introduced last summer is called a 1949 design. And are the new Packards which dealers drove away from Detroit last week 1949 or 1950 models, or just simply Golden Anniversary designs? What the tool and die people would like to see is everybody bringing out models in the late fall or at year-end. Then they could get back to the old routine of booking die business in January or February, completing it by summer in time for fall tryouts.

Another complaint of the die builders is the trend toward absorbing this work into captive shops. Fisher Body, they say, used to place 60 per cent of its die business in outside shops and handle the balance in its own die plant. Now, Fisher retains an estimated 90 per cent of its die business, releasing only a few minor jobs to the trade.

Plastic Pump Impeller

ONE of the motor companies is conducting tests on a plastic molded water pump impeller, said to involve a cost only one-half that of cast iron. An impact-type plastic molding material is used, impregnated with graphite. In addition to low cost the plastic impeller is reported to be resistant to abrasion and the action of hard water or antifreeze solutions, as well as being rustfree. It requires no machining, of course, before installation. Breakdown tests are now being concluded to determine where the plastic will fail under extreme loads.

Packard Prices Reduced

SIX of the 14 body types in Packard's new model parade have been reduced in price from $103 to $246, including equipment previously optional at extra cost, leaving only Chrysler and Studebaker yet to make downward price adjustments. The Packard cuts were the heftiest to be made by any manufacturer, except Kaiser-Frazer, and are calculated to give new models a strong sendoff. A caravan of 2000 gold-painted sedans was driven away from the company's proving grounds last week by 3000 dealers and associates who had assembled for a kickoff meeting.

A damper on the affair was suspension of Packard assembly lines because of the interruption to brake supplies from strikebound Bendix Aviation Corp. at South Bend, Ind., where 7500 remain off their jobs. Hudson, Kaiser-Frazer, General Motors and Ford were able to truck their brake dies out of the Bendix plant and arrange to set them up elsewhere. Packard, however, did not follow this policy since it was figured a minimum time of five weeks would be required to set up a new line and try out press equipment for making brake parts, and by that time it is believed the Bendix troubles may be adjusted. The Bendix strike is estimated to have idled 53,000 in various motor plants, testifying to their short inventory position on brake components.

Price on the Packard's Ultramatic transmission has been set at $225, which does not mean much since for the present it is available only as standard equipment on two custom models carrying price tags of $3975 and $4520, respectively. The company's volume models fall in the price range of $2224 to $2633, delivered in Detroit, less state taxes. They will be equipped eventually with the automatic transmission, optionally, once production of the unit advances from the initial five-a-day schedule.

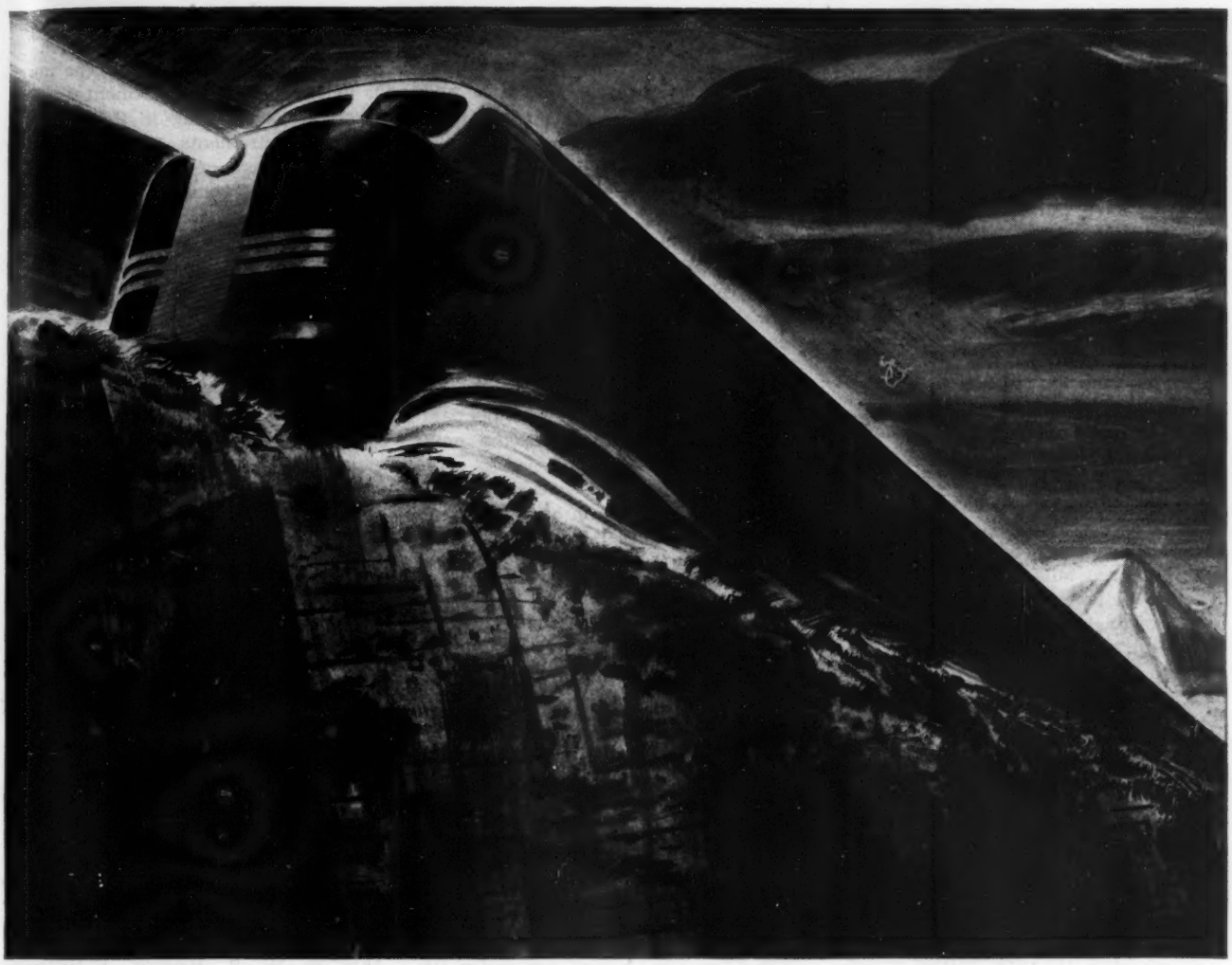
Packard earnings for the first quarter were about $3.9 million, or three times the corresponding period a year ago, with shipments totaling 30,530 units, against 17,904 in 1948. This figures to a profit of $128 per car, although it must be remembered income included that from sales of service parts and other products.

Dodge Starts Shorter Car

DODGE has launched production of a new two-door sedan on 115-in. wheelbase, priced at $1645, less taxes. This is one of three models to be offered on the short wheelbase, others being a roadster and 3-passenger coupe.

Chrysler Remodels

REMODELING of Chrysler Corp. administration building and executive offices in Highland Park is nearing completion.



This "Iron Horse" Has 38,636 Fasteners

It takes 38,636 tough, accurate fasteners of high tensile strength — to match the stress and strain on the framing members of a diesel pulling heavy freight loads.

More than 2,300 bolts . . . 13,800 nuts . . . 21,700 screws . . . 800 rivets furnish the forces that hold modern 4 unit diesel assemblies together.

Because these fasteners have such a vital responsibility, top quality is essential. That's why Russell, Burdsall & Ward for over a century has carried on continuous and intensive research and development work, and has invested consistently in large expansion and improvement programs.

With the price of fasteners such a small part of the total production cost, you'll find it doesn't pay to take chances with fastener quality. For it isn't the initial price but the cost of *using* fasteners that counts.

To attain *T*rue *F*astener *E*conomy —save assembly time, eliminate or reduce plant inspection, and get the maximum holding power per dollar of fastener cost with a dependable quality fastener. *T*rue *F*astener *E*conomy contributes to the kind of production savings that puts more and more diesels on U. S. tracks every year. It is this type of contribution to major American industries that explains why — for over 104 years — RB&W has been *making strong the things that make America strong.*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W

Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

38,636 Fasteners are used in 1 American diesel locomotive

104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Koppers Acquires Freyn

Broadens engineering service with purchase of designer, builder of steel plant equipment

KOPPERS Co. Inc., Pittsburgh, has contracted to purchase Freyn Engineering Co., Chicago, engineering firm specializing in design and construction of blast furnaces and open-hearth furnaces, and in engineering of mills, power stations and other steel mill facilities. The acquisition also will include Open Hearth Combustion Co., a Freyn subsidiary.

Purchase is to be consummated through the exchange of Koppers common stock for the stock of Freyn Engineering. Freyn will continue under its present name and for the time being will be operated as a wholly-owned subsidiary of Koppers. There will be no changes in policies or personnel. Louis T. Shorley is president and treasurer.

More Complete Service — Koppers' Engineering & Construction Division designs and constructs by-product coke ovens, auxiliaries and chemical plants. Acquisition of Freyn, according to Gen. Brehon Somervell, Koppers president, enables the Pittsburgh company to provide all branches of the steel industry with design and engineering service, and in many instances with construction service as well.

Established in 1914, Freyn develops, markets, installs and services equipment largely resulting from invention within its own organization. The company does not engage in manufacturing, but its patented equipment has been built under its supervision by contracting foundries and machine shops.

Continental Purchases Foundry

PURCHASE by Continental Foundry & Machine Co., East Chicago, Ind., of the war-built steel foundry adjacent to its plant has been announced by War Assets Administration's Chicago regional director, Otto G. Klein. The facility was bought for $900,000, of which $180,000 was paid at the time of purchase, the balance to be paid in equal installments over the next 15 years.

Operated during the war by Continental for production of heavy steel castings, but closed since July, 1945, the foundry is equipped with three 40-ton open-hearth furnaces in a main building which contains 254,000 square feet of floor space. An adjoining two-story office and service building contains approximately 28,640 square feet of space. The plant is subject to recapture by the government in event of a national emergency.

Wire Cloth Maker Buys Wire Firm

CONTINENTAL Copper & Steel Industries Inc., New York, has acquired Madison Wire Co. Inc., Hanover, Pa.

Madison's plant adjoins that of Continental's Hanover Wire Cloth Division. The acquisition will allow Hanover Wire Cloth to eliminate the purchasing of steel wire which it fabricates into wire cloth. The move is designed to help Continental make itself self-supporting in its raw material requirements throughout the entire process of manufacture.

Continental plans to expand Madison's capacity, now about 3.5 million pounds per year, so that eventually the new subsidiary will supply all of Hanover's wire needs.

Cleveland Cap Screw Expands

AT A DINNER in honor of employees Apr. 28, J. W. Fribley, president, Cleveland Cap Screw Co., Cleveland, announced that the company is constructing a new $500,000 addition to house its wire drawing facilities, metallurgical and chemical laboratories and to provide additional storage area. Over 70 per cent of its employees have been with the company five years or longer.

Bethlehem Pacific Releases Movie

BETHLEHEM Pacific Steel Corp. shortly will release a new 27-minute color motion picture entitled "Steel Builds The West." Expertly produced to tell the story of how steel is made and used, it departs refreshingly from the usual commercialism of industrial movies. Arrangements for group showings may be made through W. S. Briscoe, Bethlehem Pacific Steel Corp., San Francisco 19; or, F. A. W. Stiefler, P.O. Box 2057 Terminal Annex, Los Angeles 54.

GAMA OFFICERS: New officers of the Gas Appliance Manufacturers Association elected at the 14th annual meeting at Colorado Springs, Colo., are shown above, left to right: H. Leigh Whitelaw, New York, managing director and secretary; Louis Ruthenburg, Evansville, Ind., president of Servel Inc., second vice president of GAMA; Stanley H. Hobson, Rockford, Ill., president of the George D. Roper Corp., GAMA president; John Van Norden, New York, secretary of the American Meter Co., re-elected treasurer; Frederic O. Hess, Philadelphia, president of Selas Corp., first vice president. They will take office in October. GAMA has a membership of 535

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Chicago Association of Commerce & Industry reports investment in industrial facilities in the Chicago area in April amounted to $6,759,000, making a total of $34,395,000 for the first four months of 1949. Investments in April, 1948, totaled $5,848,000, and the corresponding four-month total last year was $45,774,000.

—o—

Torrington Co., Torrington, Conn., and South Bend, Ind., producer of roller, needle and ball bearings, has moved its Chicago office to 4352 W. Roosevelt Rd.

—o—

General Electric Co., Schenectady, N. Y., will establish a new apparatus service shop and warehouse in Richmond, Va., late this summer.

—o—

John S. Barnes Corp., Rockford, Ill., manufacturer of hydraulic structures, controls and fluid power units, has appointed Cincinnati Industrial Sales Co., Cincinnati, as its sales representative in southern Ohio and southern Indiana.

—o—

Denison Engineering Co., Columbus, O., has appointed Henry Walke Co., Charlotte, N. C., to represent it in North and South Carolina on the Denison line of oil hydraulic presses and accessories.

—o—

Paul Tishman Co. Inc., New York, has been newly formed as a building construction and general contracting firm by Paul Tishman, former vice president and director of Tishman Realty & Construction Corp.

—o—

Continental Machine Co., Chicago, has increased its facilities for manufacturing cut-off wheels for rotary pipe and tube cut-off machines.

—o—

Rheem Mfg. Co., San Francisco, expects to resume operations by the middle of this month in Salt Lake City, Utah, after suspending production there in January, 1947. A $250,000 plant will produce a line of stokers when work is resumed. A line of gas and oil furnaces will be added later.

—o—

Maneely Chemical Co. has begun preliminary operations at its new $500,000 plant at Wheatland, Pa. Maneely is working with a process designed to solve at a profit the pickle liquor disposal problem of its parent companies, Wheatland Tube Co., manufacturer of tubular products, and Wheatland Steel Products Co., maker of steel pipe couplings.

—o—

Gray Iron Founders' Society, Cleveland, has begun a new service for members in connection with experimental work on production of nodular gray iron. Under the plan, members may send to the society's office samples of irons believed to possess nodular graphite structures.

—o—

Hydrabuster Corp. has been formed in Jackson, Mich., as a subsidiary of Aeroquip Corp., manufacturer of hydraulic accessories. The new firm has acquiried designs and patent rights on the Hydrabuster, which bursts coal in mines without the use of dynamite or powder. The unit consists of a 6-foot, snake-like element which is inserted in a hole bored in the coal. The element can be expanded hydraulically.

ALUMINUM PIANO

KEY ACTION Corp., Los Angeles, has just started production of an aluminum 64-key portable piano to sell for $280. Aluminum castings and parts stamped from ⅛-in. 24ST aluminum are used in its construction. Later, an 88-key spinet will be introduced to sell for $350. The new president of the company is Kenneth C. Kingsley, formerly vice president of the Norris Stamping & Mfg. Co., Los Angeles.

Nelson Stud Welding Division, Morton Gregory Corp., Lorain, O., has made arrangements for the sale of stud welding guns, gun parts, ferrules and flux-filled studs to KSM Products Corp., Merchantsville, N. J., for resale by KSM in the United States. KSM is also licensed to manufacture and sell slug-loaded studs in this country.

—o—

E. F. Houghton & Co., Philadelphia, manufacturer of industrial oils, chemicals and leathers, has established a product development department. Dr. H. B. Walker is manager.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, reports that employees at its Otis Works in Cleveland have achieved a record of nearly 2.5 million man-hours without a disabling injury.

—o—

Vapor Blast Mfg. Co., maker of liquid honing and wet sandblasting equipment, is now occupying a new plant and general office at 3025 W. Atkinson Ave., Milwaukee.

—o—

Resistance Welder Manufacturers Association, Detroit, reports an increase of 14 per cent in shipments of resistance welding equipment for March, compared with February. Shipments of resistance welding electrodes reached a new high for the year to date, March level being 11 per cent in excess of February and 8 per cent ahead of January.

—o—

Scully-Jones & Co., Chicago, designer and manufacturer of high production tools, has appointed G. C. Wood Co., Pittsburgh, as its representative in the Pittsburgh area.

—o—

Reynolds Metals Co., Richmond, Va., has appointed Idaho Steel Products Inc., Boise, Idaho, as distributor in Idaho for aluminum mill products.

—o—

Salem Engineering Co., Salem, O., is now engineering and will build during the latter part of this year a single-fired skelp mill slab heating furnace at the Indiana Harbor, Ind., plant of Youngstown Sheet & Tube Co. Unit will have a rated capacity of 80 tons per hour.

—o—

Petley Inc., Los Angeles, a sales firm which represents Republic Steel Corp.'s Berger Mfg. Co. Division in California, Arizona and Nevada, has opened an office in Phoenix, Ariz. W. R. Stokoe is manager.

—o—

B. C. Ames Co., Waltham, Mass., manufacturer of industrial gages and indicators, has named W. E. Fry & Co., Kansas City, Mo., as representative in Kansas, Nebraska and Missouri.

—o—

Odin Stove Mfg. Co., Erie, Pa., is observing its 50th anniversary with introduction of a new line of domestic electric ranges, which will be produced in addition to its gas ranges.

—o—

Clark Bros. Co. Inc., Olean, N. Y., a unit of Dresser Industries Inc., and Frederic Flader Inc., North Tonawanda, N. Y., will build jointly an experimental gas turbine to drive a centrifugal compressor in Tennessee Gas Transmission Co.'s gas line near Moorehead, Ky.

The Business Trend

FOLLOWING the preceding week's upswing to the highest point for the year, STEEL's industrial production index dropped 4 points in the week ended Apr. 30 to 172 per cent of the 1936-1939 average. The revised index figure of 176 for the week ended Apr. 23 was two points higher than the next best weekly total this year.

AUTOMOBILES—Just as the total of 141,227 passenger car and truck assemblies in the week ended Apr. 23 was largely responsible for the climb of the industrial production index, the drop of about 7500 units to 133,714 during the week ended Apr. 30 was a big factor in its decline. Labor unrest caused the drop in production as schedules called for an outturn higher than the week before. Several of the independents are already down. Labor trouble in the near future seems to be in store for at least one of the Big Three. Some of the trouble stems from efforts to increase worker productivity.

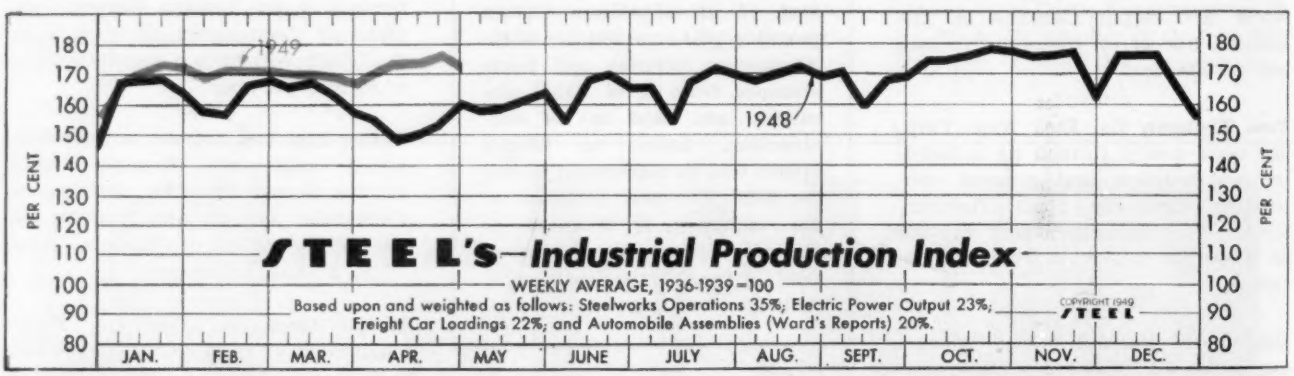
SALES—Commerce Department reports that manufacturers' sales in March totaled $17.7 billion, close to the February level on a seasonally adjusted basis, while the book value of inventories declined below February. Durable goods sales of $7.6 billion in March represented a rise of about $600 million over the preceding month but the rise was almost entirely seasonal. The best showing was made by the machinery group with some improvement reported by the building materials industries.

PRODUCTION—The seasonally adjusted industrial production index of the Federal Reserve Board declined further in March to 184 per cent of the 1935-1939 average, compared with 189 in February and with the postwar peak of 195 in October and November, 1948.

PRICES—Average primary market prices continued to decline in the week ended Apr. 26, according to the Bureau of Labor Statistics. The bureau's wholesale price index was at 156.1 per cent of the 1926 average in the latest week, 1.3 per cent lower than four weeks ago and 4.5 per cent lower than the comparable week in 1948. Metals and metal products index also continued to drop during the week and was at 170.5 per cent of the 1926 average.

WORKING CAPITAL—Securities & Exchange Commission estimates that net working capital of U. S. corporations at the end of 1948 amounted to $64.8 billion, an increase of $4.2 billion during the year. The increase resulted from a rise of $6.6 billion in assets, partly offset by a rise of $2.4 billion in current liabilities. The increase occurred in the first three quarters of the year, however, as net working capital in the last three months showed a decline for the first time since the war.

BUSINESS—Despite the increasing number of business failures, March new business incorporations showed a more than seasonal rise. Total for March was 7637 incorporations, 20 per cent higher than the February aggregate of 6362 but the smallest March total in four years.



Index (chart above): Week ended Apr. 30 (preliminary) 172 Previous Week 175 Month Ago 171 Year Ago 160

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	98.0	99.0	100.0	87.0
Electric Power Distributed (million kilowatt hours)	5,304	5,326	5,378	5,042
Bituminous Coal Production (daily av.—1000 tons)	1,892	1,908	395	1,952
Petroleum Production (daily av.—1000 bbl)	4,922	4,916	5,072	5,413
Construction Volume (ENR—Unit $1,000,000)	$145.9	$107.3	$132.2	$183.3
Automobile and Truck Output (Ward's—number units)	133,714	141,227	119,088	102,967

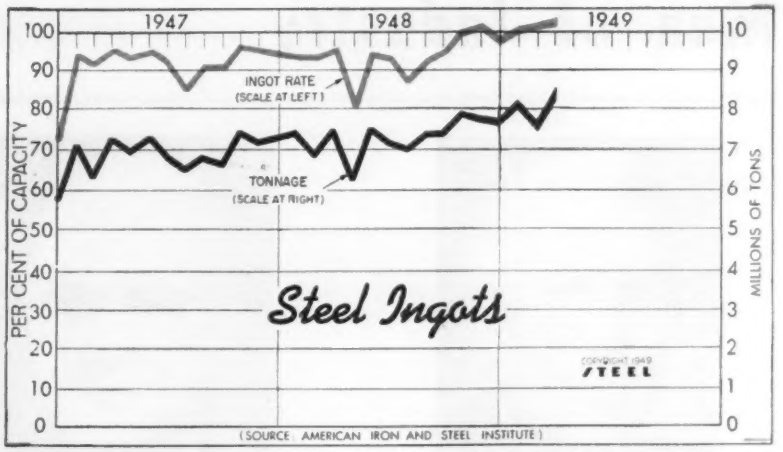
* Dates on request. † 1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.

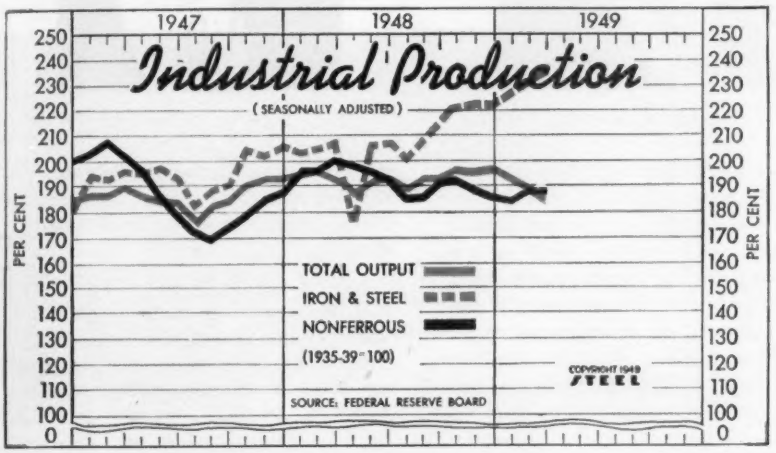
TRADE				
Freight Carloadings (unit—1000 cars)	771†	769	726	892
Business Failures (Dun & Bradstreet, number)	204	198	216	106
Money in Circulation (in millions of dollars)‡	$27,356	$27,408	$27,403	$27,682
Department Store Sales (changes from like wk. a yr. ago)‡	−10%	+7%	−16%	+11%

† Preliminary. ‡ Federal Reserve Board.

Steel Ingots

	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1949	1948	1947	1949	1948	1947
Jan.	8,183	7,473	7,213	100.2	93.6	93.2
Feb.	7,481	6,940	6,422	101.4	93.0	91.9
Mar.	8,389	7,608	7,307	102.7	95.3	94.4
Apr.	....	6,218	7,043	....	80.4	93.9
May	....	7,572	7,329	....	94.8	94.7
June	....	7,256	6,969	....	93.8	92.9
July	....	7,067	6,570	....	88.7	85.1
Aug.	....	7,438	6,982	....	93.1	90.2
Sept.	....	7,416	6,789	....	96.1	90.8
Oct.	....	7,987	7,560	....	100.0	97.7
Nov.	....	7,787	7,233	....	100.7	96.5
Dec.	....	7,771	7,366	....	97.5	95.4
Total	....	88,534	84,784	Ave. ...	94.0	93.0





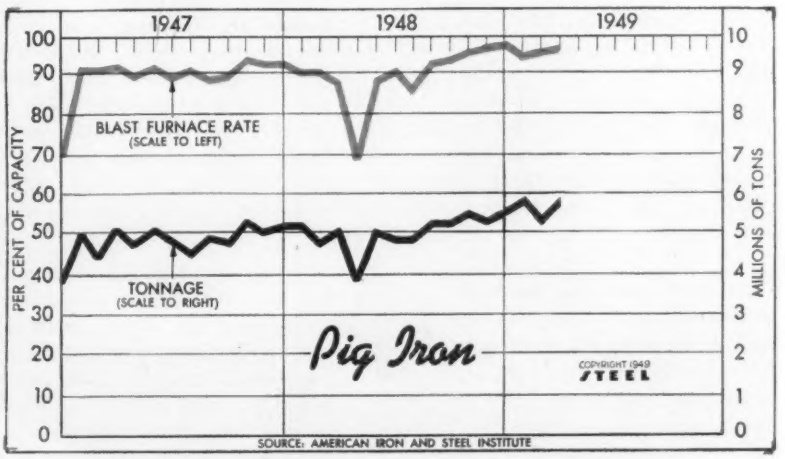
Federal Reserve Board's Production Indexes (1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1949	1948	1949	1948	1949	1948
Jan.	191	193	228	203	184	197
Feb.	189	194	232	203	186	197
Mar.	184	192	234	207	187	200
Apr.	...	188	...	177	...	198
May	...	191	...	206	...	197
June	...	192	...	207	...	193
July	...	186	...	200	...	185
Aug.	...	191	...	207	...	186
Sept.	...	191	...	214	...	191
Oct.	...	195	...	221	...	192
Nov.	...	195	...	223	...	187
Dec.	...	192	...	222	...	185
Ave.	...	192	...	208	...	193

Pig Iron*

	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1949	1948	1947	1949	1948	1947
Jan.	5,725	5,194	5,071	95.5	90.9	90.8
Feb.	5,223	4,838	4,550	96.5	90.6	90.3
Mar.	5,820	5,020	5,123	91.1	87.8	91.8
Apr.	....	3,840	4,830	...	69.4	89.3
May	....	5,077	5,081	...	88.8	91.0
June	....	4,990	4,810	...	90.2	89.0
July	....	4,900	4,585	...	85.9	90.3
Aug.	....	5,255	4,916	...	92.0	88.1
Sept.	....	5,208	4,801	...	94.3	89.0
Oct.	....	5,520	5,228	...	96.6	93.6
Nov.	....	5,399	5,015	...	97.6	92.8
Dec.	....	5,595	5,177	...	98.1	92.9
Total	....	60,849	59,210	Ave. ...	90.2	90.1

* Includes ferromanganese and spiegeleisen.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,698	$13,126	$12,592	$13,790
Federal Gross Debt (billions)	$251.4	$251.4	$251.7	$252.2
Bond Volume, NYSE (millions)	$15.1	$18.8	$16.6	$22.6
Stocks Sales, NYSE (thousands)	4,332	5,228	6,538	7,639
Loans and Investments (billions)†	$61.3	$61.1	$61.7	$63.5
United States Gov't. Obligations Held (millions)†	$32,766	$32,767	$32,680	$35,643

† Member banks, Federal Reserve System.

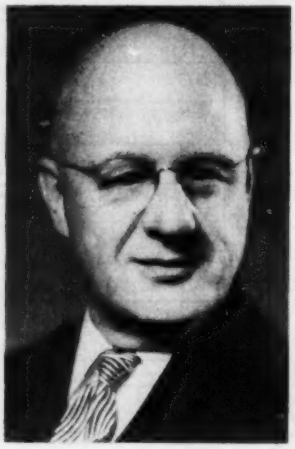
PRICES

STEEL's Composite Finished Steel Price Average	$94.45	$94.45	$96.68	$81.14
STEEL's Nonferrous Metal Composite‡	193.2	194.4	216.9	196.6
All Commodities†	156.1	156.9	158.1	163.5
Metals and Metal Products†	170.5	171.5	174.6	157.6

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

J. H. TREDINNICK



FRANK H. FANNING

JACK W. CRAWFORD

J. H. Tredinnick has been named vice president of E. W. Bliss Co., Detroit. He is manager of the company's Hastings, Mich., plant, which specializes in the manufacture of small and medium-sized punch presses and high production presses. Mr. Tredinnick joined Bliss in 1935 to take charge of this plant. For the previous six years he was factory manager of V & O Press Co., Hudson, N. Y.

—o—

H. Robinson Hyde, assistant to the vice president in charge of production, National Screw & Mfg. Co., Cleveland, has been appointed production manager of the company's main plants in Cleveland. **Samuel M. Washabaugh,** production manager, has been appointed manager of sales promotion.

—o—

William F. Godejohn has been elected vice president in charge of operations and a director of Harbison-Walker Refractories Co., Pittsburgh. He has been assistant to the president since 1948, and was formerly Missouri district superintendent for the company, with jurisdiction over the Vandalia and Fulton Works.

—o—

B. D. Claffey, executive vice president and general manager, Acme Aluminum Alloys Inc., Dayton, O., has been elected president, and **Karl A. Stein,** former president, was elected chairman of the board of directors. **Robert J. Stein** succeeds **George H. Stein** as a member of the board. **George H. Stein** continues as vice president and **R. C. Crouch** was re-elected secretary, treasurer and director of the corporation.

—o—

K. M. Nelson has been appointed industry specialist for Cutler-Hammer Inc., Milwaukee, a newly created position established to more adequately meet the motor control needs of machine tool and air conditioning fields. Associated with the company's machine tool and air conditioning products for a number of years, Mr. Nelson was given responsibility of promoting closer co-operation between Cutler-Hammer and these industries.

—o—

Frank H. Fanning, connected with Armco Steel Corp., Middletown, O., in varying duties since 1909, has been elected vice president of operations, succeeding the late **F. E. Vigor. William H. Mitchell,** president, Mitchell Steel Co., Cincinnati, has been elected a director of Armco.

—o—

John G. Spruhan has been appointed Central Division sales manager, Townsend Co., New Brighton, Pa., with headquarters at Detroit. He will co-ordinate activities of the Detroit and Cleveland offices for the sale of rivets, bolts, nails and special metal fasteners.

—o—

Donald Williams has been promoted from general sales manager to director of sales, Dow Chemical Co., Midland, Mich. The latter position was vacated by **Leland I. Doan** when he became president in April. **Donald K. Ballman,** former assistant general sales manager, succeeds Mr. Williams, and **Dr. L. S. Roehm** has been appointed assistant general sales manager. Dr. Roehm has been in charge of the company's Technical Service & Development Division, and will continue also in this capacity.

—o—

Victor Ladetto has been appointed sales manager, and **Donald H. Sleeper,** assistant sales manager of Continental Screw Co., New Bedford, Mass.

—o—

Jack W. Crawford has been appointed manager of the newly created Distributor Sales Division of Firth Sterling Steel & Carbide Corp., McKeesport, Pa. Prior to joining the company on Mar. 1, 1949, Mr. Crawford was with Firestone Tire & Rubber Co., Akron, and later organized new sales departments for Adel Precision Products Corp. and Menasco Mfg. Co., holding the position of sales manager at both companies. In 1946, he formed his own company, the Crawford-Wanka Sales Co., Los Angeles, distributing automatic supply lines.

—o—

Sharon Steel Corp., Sharon, Pa., will combine operations of its Lowellville and Farrell plants under one management. **H. P. Rees** is named general superintendent of the combined plants, and **William J. McGaffney,** assistant general superintendent. **J. T. Bachman,** assistant operating vice president, has been transferred to the sales department, and **F. B. Quigley,** general superintendent of the Farrell Works, has been named a consultant.

—o—

Vulcan Iron Works, Wilkes-Barre, Pa., announces appointment of **J. F. O'Brien** as general sales manager, and **C. A. Netter** as general purchasing agent.

—o—

Alan Carver has been appointed manager of the New York branch office of Standard Tool Co., Cleveland. **Paul E. Lees** has been elected

Is PHYSICAL STRENGTH your magnet problem?

Mills agree that skull-cracking subjects a magnet to the roughest of service. Cautioning crane operators to "take it easy" is sage but frequently impractical advice.

Why not fit your magnet to the job when you buy?

Ohio *basket-type* magnets are specially constructed to withstand hard knocks. "Fenders" project beyond magnet diameter . . . stave off and protect against damaging blows.

For extra magnet life in rough service, install Ohio *basket-type* magnets. Write today to Ohio — 25 years a leader in *magnetic materials handling.*

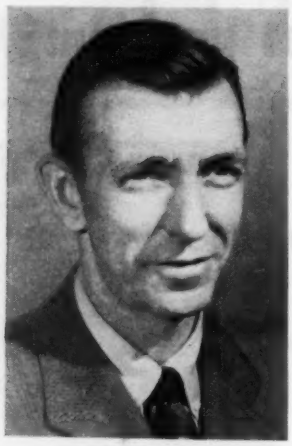
Use "basket" construction for rough service

OHIO PROTECTO-WELD MAGNET is welded *on top,* where weld cannot be dented in. Sizes include 39, 46, 55 and 65-inch diameters. Ohio also builds magnet control equipment.

THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVENUE • CLEVELAND 4, OHIO

ohio MAGNETS

A-3039



CARL J. MURRAY

DUNCAN S. CAMERON

F. W. BREMMER

vice president in charge of sales; **Joseph W. Bremer,** secretary-treasurer; **William S. O'Conner,** sales manager; **Elton Hoyt III,** assistant sales manager; **Lewis D. Fykse,** manager of service engineering; **Joseph Klima,** manager of the order department; **Chester Elliott,** manager quotation department; **Chester Hemerlin,** manager inventory control; and **Norman Duenk,** chief metallurgist.

—o—

Carl J. Murray has been named manager, Wickwire Spencer Steel Division plant in Tonawanda, N. Y., for Colorado Fuel & Iron Corp. He succeeds **John F. Black,** resigned. Mr. Murray was formerly superintendent of Jessop Steel Co. and plant engineer of Crucible Steel Co. of America prior to joining Wickwire. **Duncan S. Cameron,** formerly with Pacific States Steel Co. and Republic Steel Corp., was appointed open hearth superintendent at the Wickwire plant.

—o—

Hunter Gehlbach has been appointed assistant general counsel for Borg-Warner Corp., Chicago.

—o—

Chester H. Sanderson has been appointed advertising manager, Mine Safety Appliances Co., Pittsburgh. He has been employed for over 20 years in the company's direct mail, display and advertising departments.

—o—

John L. Wilson Jr. has been appointed Pittsburgh engineer representative of Selas Corp. of America, Philadelphia. He previously was combustion engineer for Armco Steel Corp. at Butler, Pa.

—o—

Carl H. Black has been elected president, American Can Co., New York, succeeding **Dudley W. Figgis,** who has been president of the company since 1943, and who was named chairman of the board following the retirement of **Maurice J. Sullivan** as the company's chief executive officer. Mr. Sullivan continues as a director and a member of the executive committee. **William C. Stolk,** vice president in charge of sales, succeeds Mr. Black as executive vice president.

—o—

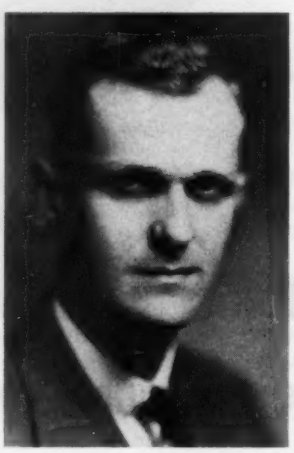
Carl B. Pollock, manager of production, has been elected vice president in charge of production for Allegheny Ludlum Steel Corp., Pittsburgh. **Emil Kern,** chief engineer, was elected to a newly created vice presidency. Mr. Pollock succeeds **M. C. Harris,** resigned.

—o—

Dr. W. A. Bain, since 1947 assistant to the technical director, Kellex Corp., subsidiary of M. W. Kellogg Co., New York, has been promoted to director of chemical research.

—o—

George B. Mosely has been assigned to supervise stamping and contract manufacturing sales at the Firestone Steel Products Co., Akron. Mr. Mosely has been in stamping sales work a number of years, and most recently was employed by Globe Stamping Division, Hupp Corp., where he served as sales manager of the Contract Manufacturing Division.



DR. W. A. BAIN

—o—

F. W. Bremmer has been elected vice president in charge of manufacturing, National Supply Co., Pittsburgh, filling a vacancy in that position created with the retirement of **Charles R. Barton** a year ago. Associated with the company for 25 years, Mr. Bremmer has been works manager of the Spang-Chalfant Division's Ambridge plant since May, 1948.

—o—

L. F. Reinartz and **R. S. Gruver** have been named assistant vice presidents, Armco Steel Corp., Middletown, O. Mr. Reinartz has been associated with the company since 1909. He became manager of the Middletown Division in 1938, and he will continue in that position. In addition, the company's Coal Mining Division in West Virginia will report to him. Mr. Gruver joined Armco in 1925. He was made manager of the Ashland Division in 1943, and recently was promoted to administrative assistant, Operating Division. **C. G. Davies,** who since 1943 has been assistant to vice president, has been appointed administrative assistant, Operations Division of the company.

—o—

F. H. Boor has announced opening of a gear engineering office in Lafayette, Ind. He was chief engineer of Fairfield Mfg. Co., Lafayette, for more than 20 years, in charge of gear and tool design, purchasing of special tools, experimental and research work.

—o—

Youngstown Sheet & Tube Co., Youngstown, announces the following changes: **John P. DeHetre,** de-

velopment engineer, has been appointed manager of oil country tubular sales, succeeding **Jay W. Owings,** recently made assistant general manager of sales for the company. **Robert E. Hawley,** pipe sales, has been appointed assistant manager of oil country tubular sales. **Kenneth J. Holme** has been promoted from assistant superintendent of rolling mills to superintendent of tin mill hot strip mill at the Indiana Harbor works, and is succeeded by his brother, **Ernest Holme,** former roller in the bar and billet mills. **C. L. Lindholm** has been appointed assistant superintendent of the Indiana Harbor work's roll department.

—o—

Carter B. Hart, formerly sales representative in the Boston district office, Allis-Chalmers Mfg. Co., Milwaukee, has been named dealer supervisor of the New England region.

—o—

Robert G. Harrison has been appointed sales representative for northern Ohio for National Radiator Co., Johnstown, Pa. He will have headquarters in Cleveland. Before joining National Radiator Co. Mr. Harrison was associated with Republic Steel Corp. at Canton, O., as combustion engineer, and also spent several years as a heating consultant in northern Ohio, with offices in Canton.

—o—

E. F. Drew & Co. Inc., Power Chemicals Division, New York, announces the following additions to its technical and research departments: **Vincent P. Murphy,** formerly of Hall Laboratories, has joined the technical department, and **John W. Wood,** formerly of Permutit Co., has joined the research department. Both men will

PHILIP G. BOYD

Appointed Chicago district sales manager, Youngstown Sheet & Tube Co., Youngstown. Noted in STEEL, May 2 issue, p. 78

carry out work in connection with the expansion of this division.

—o—

John W. Dalton has been appointed plant superintendent of J. C. Corrigan Co. Inc., Boston, succeeding **B. H. Corrigan,** who will join the sales force of the company's Portable Conveyor Division.

—o—

D. L. Kuhner, superintendent of the Portsmouth, O., works of Harbison-Walker Refractories Co., Pittsburgh, has been appointed superintendent of the company works at Olive Hill, Ky. He is succeeded at Portsmouth by **R. H. Cook.**

—o—

Nelson R. Church will direct sales in Rhode Island, Massachusetts, Vermont, New Hampshire and Maine for Detroit Die Set Co., Detroit. **E. M. Benson** was appointed Connecticut representative. Sales in New York, Long Island, Manhattan and northern New Jersey will be supervised by **C. W. Keeny.**

—o—

W. G. Arnold has been appointed works manager, Fitchburg, Mass., works of General Electric Co., and will continue in his present capacity as manager of manufacturing for the two General Electric divisions, Turbine and Welding, located at Fitchburg. **Frank C. Neal Jr.** has been appointed manager of the Distributor Sales Division of the company's Welding Divisions. He will make his headquarters at Fitchburg.

—o—

Robert L. Baldwin has been appointed assistant to **G. A. Wallerstedt,** western district manager for Hardinge Co. Inc., York, Pa. He had former association with National Carbon Co. Inc. as sales development manager of its Electrode Division, Niagara Falls, N. Y.

—o—

B. F. Gill has been transferred to Philadelphia as district field manager, Associated Lines Sales Division, B. F. Goodrich Co., Akron. He held a similar post in Detroit since 1947, and is succeeded there by **Ernest Hookway.**

—o—

David A. Stuart has retired as Pittsburgh district sales representative of Heppenstall Co., Pittsburgh, after 24 years' service in the sales department of the company.

—o—

Edward L. Lockman has been appointed manager of tank lining and roll covering sales for the United States Rubber Co., New York, where he has been assistant sales manager.

—o—

Hugh Wainwright has been appointed sales engineer, Electronics Division, Sylvania Electric Products Inc., New York.

OBITUARIES . . .

Eben J. Fullam, 78, chairman of the board of directors, Fellows Gear Shaper Co., Springfield, Vt., died at his winter home in Mt. Dora, Fla. He became associated with the company in 1898. He had served as treasurer, vice president and president of the company, and had retired from the latter position last November.

—o—

Sidney M. Bernheim, president and owner of Fabricating & Machinery Inc., Birmingham, died Apr. 25.

—o—

Charles J. Staples, 75, general counsel and director emeritus, Carrier Corp., Syracuse, N. Y., died in DeLeon Springs, Fla., Apr. 26. He had been general counsel of the firm and its affiliates since 1927.

—o—

William R. Jones, 72, general manager, Jones Bros. Structural Steel Co., Ravenna, O., died recently.

—o—

C. Neal Barney, 73, vice president, secretary and general counsel of Worthington Pump & Machinery Corp., New York, died Apr. 24.

—o—

Allen F. McLane, 61, field engineer, Fabricated Steel Construction Division, Bethlehem Pacific Coast Steel Corp., San Francisco, died recently at Gloucester, Mass., where he was convalescing from an operation. Mr. McLane served during the war as construction engineer on the West Coast for Bethlehem's Shipbuilding Division. Before his illness he was in charge of planning the erection of the Tacoma Narrows Bridge in Washington state.

—o—

Russell S. Feicht, 80, retired director of engineering, Westinghouse Electric Corp., Pittsburgh, died recently.

—o—

William P. Brown, 52, retired president, Briggs Mfg. Co., Detroit, died Apr. 25. He retired from the company in 1945.

—o—

Hiram A. Holzer, president, United Iron Works Co., Pittsburg, Kans., died recently.

325 BLISS-Built Presses at The

Turret top completely formed with one stroke of Bliss enclosed toggle press after being removed from die.

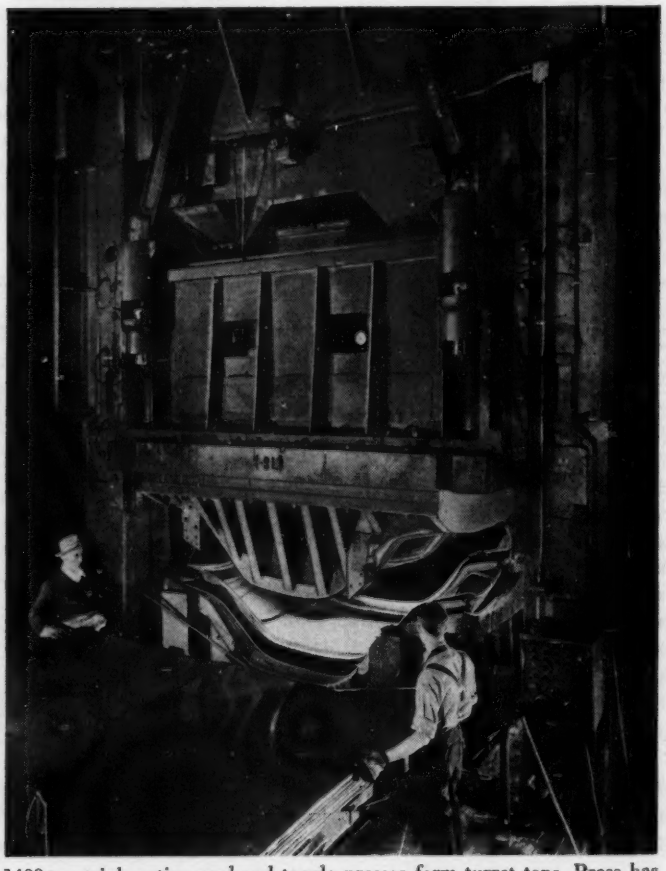
Counsel on right press for job and prompt service are big factors

IT'S A FACT! Over 325 Bliss presses of all types and sizes fabricate a diversified line of steel products in the plants of the Murray Corporation of America, one of the largest producers of automotive parts and home appliances.

Fully 75% of the presses in Murray's Detroit plant alone are Bliss-Built! They range from the 40-ton Bliss inclinable press shown blanking parts for a home-appliance unit to the 1400-ton triple-action toggle press which forms turret tops of low, medium and high priced cars.

Some of the ways Bliss presses are kept busy in this plant are illustrated in the accompanying photos.

Two of a battery of 15 Bliss straight-side double-crank presses are shown forming pillars.



1400-ton triple-action enclosed toggle presses form turret tops. Press has four points of pressure on blankholder slide; is made of stress-relieved steel.

Engineering News . . . AT A GLANCE

EFFICIENCY PLUS— Side gear pockets of differential cases in the plant of one motor car company are bored and faced automatically at a production rate of 100 pieces per hour by a special machine designed by Cross Co., Detroit. The machine, production rate of which is much larger than possible by previous methods, is pushbutton operated and only requires the services of an operator for loading and unloading operations.

NEW MOLDING TECHNIQUE— Latest instrument current transformer introduced by General Electric Co., Schenectady, N. Y., is reported to be the first unit to which the butyl-molded technique has been successfully applied. In the molding operation of the transformer, which is rated 5000 v at 25-60 cycles, core and windings are assembled together, baked out completely and positioned in a hot cast iron mold. Butyl is injected into the mold under controlled pressure and temperature. When the mold is completely filled, a mechanical shut-off is closed to retain the pressure, and the mold is placed between two hot steel plates for curing. Subsequent operations include removal of flash, coloring the nameplate and polarity markings and attaching secondary terminal hardware and cover.

FREQUENCY FACTOR— Limitations and disadvantages to linestarting involving direct current motors are imposed by the installation, and have little bearing on the design or performance of the motor, E. C. Watson, Westinghouse Electric Corp., Buffalo, told members of the AIEE in New York recently. Most important factor in determining whether a linestarted motor can be applied is frequency of operation. If frequency is low, most other factors become relatively unimportant, and consideration need only be given to the motor itself. When frequency is high, then other factors, such as type of circuit, side loads, etc., need be considered besides the design of the motor itself.

TRIPLE-BRAZING OPERATION— Three distinctly different gages of tubular aluminum are brazed with only a 50-degree temperature differential between the flow point of the brazing alloy and the burning point of the components—at the rate of 500 assemblies per hour—on a special-purpose automatic gas-fired machine currently produced by Selas Corp. of America, Philadelphia. The 2-stage machine employs 16 soft flame gas burners, each controlled for heat input and placed to give the required brazing heat patterns. Unit also includes a variable speed control which is synchronized with the time-heat requirements at the operations.

BLAST FURNACE SIZES INCREASE— Average size of blast furnaces in the United States increased over the past 10 years, G. P. Burks, division superintendent blast furnaces, Gary Works, Carnegie-Illinois Steel Corp., pointed out to members of the American Institute of Mining and Metallurgical Engineers in Chicago recently. Remarkable increase, he said, is in furnaces with hearth diameters of 25 feet and over, increasing from 4.2 per cent in 1938 to 24.1 per cent in 1948. Percentage of furnaces having hearth diameters between 20 and 25 feet increased in 1938 and thereafter remained practically constant. Percentage of those with smaller hearths decreased markedly, and those with hearth diameters of 15 feet and less would decrease more rapidly if furnaces producing ferroalloys were omitted.

FLEXIBLE OPERATIONS — Much advanced thinking is apparent in Buick's new torque converter plant. When plans for tooling were being made, engineers did not overlook the possibility that output might be expanded to make this automatic transmission available for additional models selling in lower price ranges. Thus machining setups for transmission components were designed to handle higher production rates than the first year's output alone warranted. (p. 98)

LIKE BUYING INSURANCE—Value of systematic maintenance is gaining increasingly wider recognition among manufacturers. With mechanization of processing lines continuing to increase, production management is focusing more attention on the stocking of adequate replacements for motors driving essential machines. It is pointed out, however, that there are no inflexible rules of parts stocking providing equal application to all cases. Buying repair parts for stock is likened to purchasing insurance. (p. 103)

MECHANICAL "LABOR" — Volume and standardization of loads are the two principal requirements for using conveyors where materials must move continuously over fixed lines of travel between fixed points. As a result, conveyors in many metalworking operations serve as an integral part of production processes. While first objective in utilizing industrial conveyors was to reduce nonproductive labor, these mechanical helpers have had far reaching effects upon productive efforts. (p. 105)

ROOM FOR IMPROVEMENT—Coke produced directly from the ovens represents about 75 per cent of a coking plant's income. While the oven is the heart of a coke plant, and the coal it receives is its life blood, much too little thought and money is spent on the proper preparation of the coal. It is pointed out that proper and adequate coal blending equipment can increase the suitable coal reserves in this country enormously. (p. 117)

Indexing Fixtures and Automatic Cu

Cut Production Costs on

Fig. 1 — Bearing retainers receive first rough and semifinish cuts in this two-slide Sundstrand lathe, both boring and facing operations being performed

Fig. 2—After machining flanged face of this bearing retainer, it is mounted against this machined face while opposite face has a recess bored and faced and an undercut produced in this LeBlond setup

Fig. 3 — Many holes are drilled, reamed and tapped in this two-way LeMaire setup that includes a dial fixture having one loading and three working stations

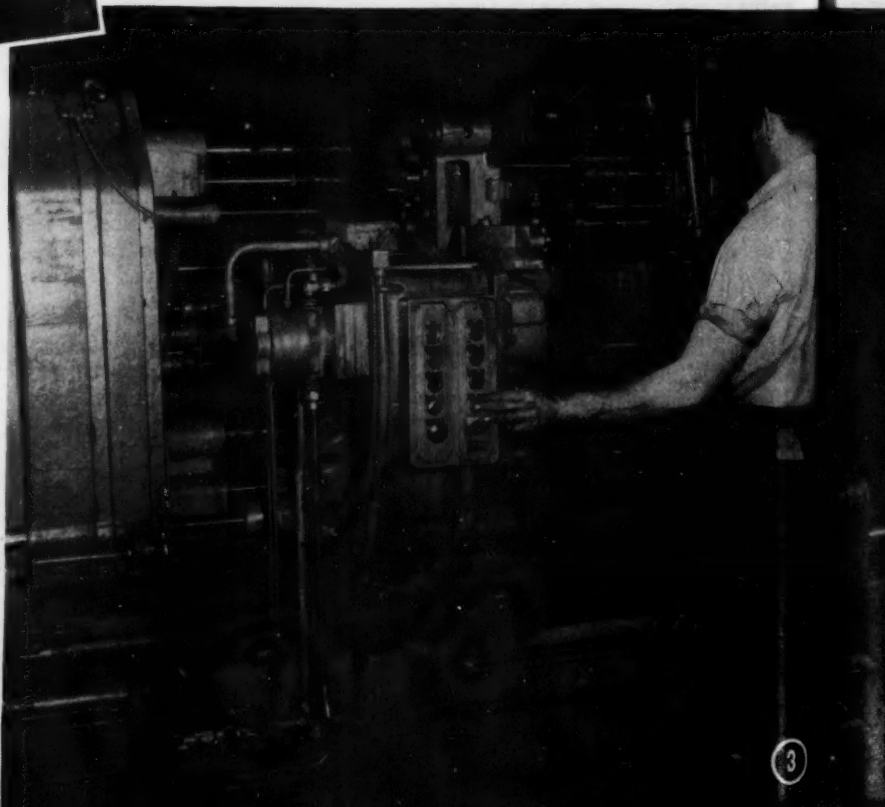
Fig. 4—In this second LeMaire setup, two vertical heads do drilling and tapping and a horizontal head reams a side hole. There are five working and one loading stations

WHEN Buick production men tooled up the new plant for manufacture of Dynaflow torque converters, they did not overlook the possibility that output might have to be expanded to make this transmission available for additional models selling in lower price ranges. For that reason setups were designed to take care of higher production rates than the first year's output alone might have warranted. Such "advanced thinking" will be apparent throughout this article.

Among components in the transmission case back of the converter proper are several cast iron parts. Machining of these is typical of the latest machine shop practice. Operations about to be described were selected from many almost equally worthy of mention.

Machining of the casting, termed a rear bearing retainer, starts with the two operations shown in Figs. 1 and 2. While designated as "roughing", these initial operations actually include semifinishing cuts. The first setup, Fig. 1, is on a Sundstrand automatic lathe. This machines the 4.8765 and 1.289-inch bores, faces one end and takes certain other cuts, including radius where face and bore join.

Special Chuck Employed—Work is air clamped in special chuck, its rear rough face being seated against



By HERBERT CHASE

tic Cycling
ston Dynaflow Parts

Tool engineers at Buick, foreseeing increasing adoption of torque converters, equip new plant to handle current volume efficiently and with ability to deal with heavier demands in future

the chuck body. Both tool holders advance, make their respective cuts, then retract autmatically. The machine runs through its full automatic cycle after starting button is pressed, the operator in the meantime loading and starting a second and similar lathe set up to machine the opposite ends of these parts.

When the operations shown in Fig. 1 are completed, the lathe stops. The operator then takes out the machined part, puts in another casting and shifts the partially finished casting to a LeBlond lathe. This lathe, shown in Fig. 2, is equipped with four tools in all. They are carried on two hydraulically fed slides. These tools produce the recess, including its face, the undercut recess where face and bore come together and the chamfer at outer end of bore.

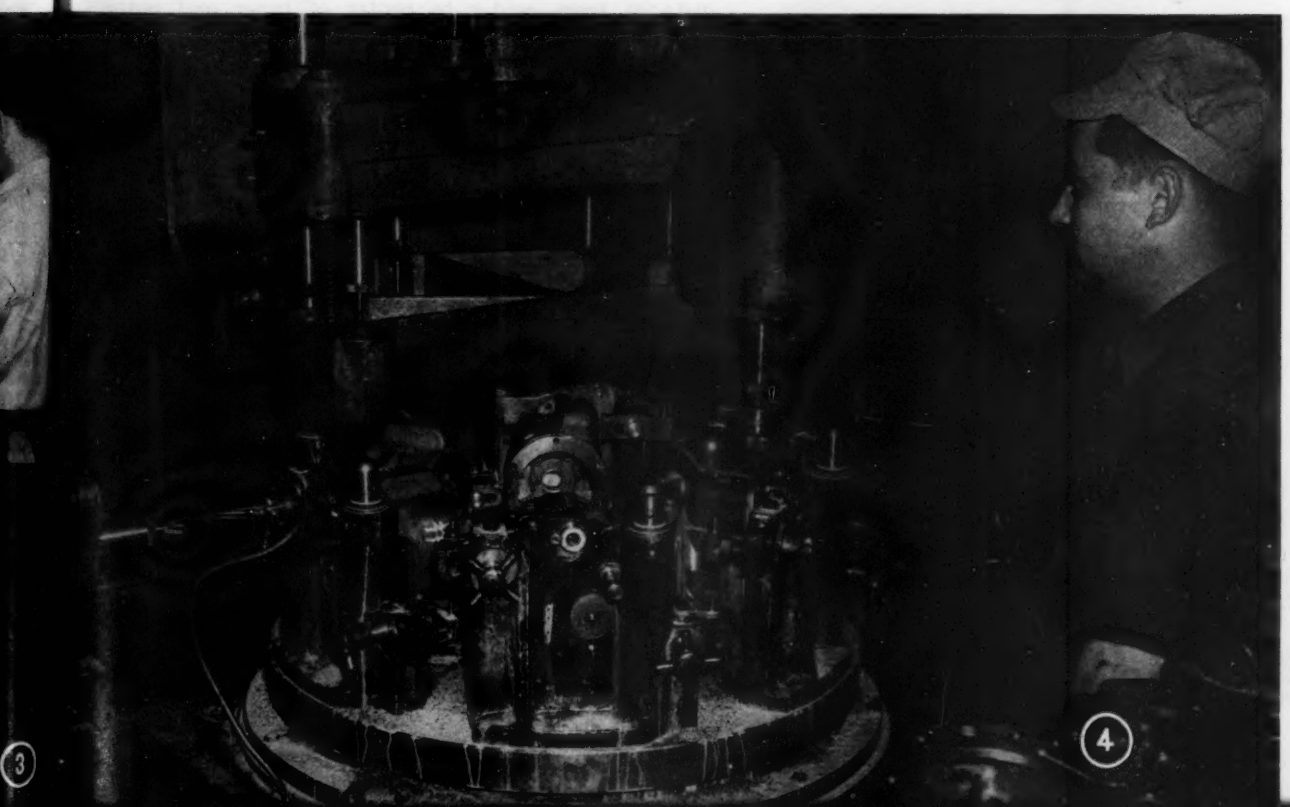
Location in this case is from face and large bore already machined in the prior setup. Work is loaded and locked by hand against a special faceplate. As in the previous instance, this LeBlond machine runs through its cycle automatically after starting button is pressed, thereby permitting one operator alternately to load and unload two machines. Carbide bits enable cuts to be taken at high speed, resulting in fine finish.

Major diameters at each side must be concentric within 0.003-inch and the two major faces must be true within 0.004-inch total indicator reading. These two setups take care of the principal roughing and semifinishing operations, whereupon the casting is ready for multiple drilling, reaming, tapping and chamfering operations that follow in successive setups.

Four-Station Index—First among these secondary operations is that depicted in Fig. 3. This is a two-way LeMaire horizontal drilling, reaming and tapping machine in which the work is clamped in a central fixture. This fixture is designed to index to four stations including one for loading. Thus the work is aligned with three successive clusters of tools. Loading and clamping of work are done by hand in the front station. From there on the three successive sets of operations are performed automatically—including automatic indexing. This cycle is initiated by pressing start button after loading the fixture.

In lower station seven holes are drilled. At the rear station four holes are drilled. At the top station seven holes are tapped and one deep hole is drilled and another is reamed. Work proceeds at these three stations while operator is unloading one casting and loading the next. All tools must retract before the machine can index. Tools in this machine all revolve on axes parallel to those of the casting themselves.

Next in the production line is a group of three milling machines all handled by one operator. These handle three operations, namely, facing a pad and one



(3) (4)

edge and cutting an internal slot. Following this milling, castings go to a second LeMaire setup, Fig. 4. This features a six-place fixture having five operating stations. Main vertical head operates four drills, not all of which are in the same fixture position, however. There also are a secondary vertical head carrying a tap and a horizontal side head from which one hole is reamed. Here again the operator merely unloads the machined casting and clamps an unfinished one in place at the "idle" station. Operations at other stations are automatic.

A third LeMaire machine, Fig. 5, is of similar character, its six-place fixture having five working stations. The main vertical head operates four drills, while a secondary vertical head does a reaming operation. In addition to the foregoing, a horizontal head performs three operations, namely, drilling, tapping and reaming.

Next in order come two double-spindle Heald Borematics. One of these takes the finish facing cut on major surfaces already roughed and semifinished in the first Sundstrand setup. This machine also finishes the small bore. The second Heald machine finishes stepped recess, including radius and center hole chamfer. Chamfering comes first, by means of a tool nearest the center. Facing cut follows after this first tool backs off.

From the Borematics, the castings go to a fourth LeMaire machine in which, as shown in Fig. 6, another horizontal dial fixture is employed. The main vertical head carries four tools that drill, rough and finish spot. A secondary vertical head taps one hole. As to the two side heads set at the same odd angle, that at left drills two holes, and the one at right taps the same holes.

Next to the last operations on this line are those in a Hannifin setup where breather tube and bushing are pressed into holes previously machined. Finally, these assemblies go to another Borematic where bushings that have just been mentioned are bored to finished size.

One-Piece Pump Body—Representative of many interesting operations on other cast iron Dynaflow details is that depicted in Fig. 7. This is rear pump body. Equipment involved is a three-spindle Excello precision boring machine. This pump body, formerly made as two separate castings, now is cast in one piece. One of its peculiarities is a boss shaped like a crescent with ends cut off square. Inner arc of this crescent is concentric with the main body but its outer arc is concentric with a hole ¼-inch eccentric to the main body.

Major concentric and eccentric diameters, outer face and surface in line with bottom of boss are finish machined at one setup but not in a single position of the piece.

Fixture includes two identical recesses and is on a table that shifts into two successive positions. Each spindle of the machine carries its own tools, those on the two outer spindles being identical and making identical cuts—though not on the same piece. The third spindle has different tools.

Cuts Made Simultaneously—In operation, two identical castings are loaded, one in each fixture recess, locking being done hydraulically. As carriage is fed forward, one casting comes into position for the machining of its eccentric surfaces by tools on one of the outer spindles, the other into position for machining of its concentric surfaces by tools in the center spindle. Both sets of cuts are made simultaneously as the carriage feeds into the tools, one cut being taken on one piece and one on the other. Tools on the third spindle are not cutting during this phase of the cycle.

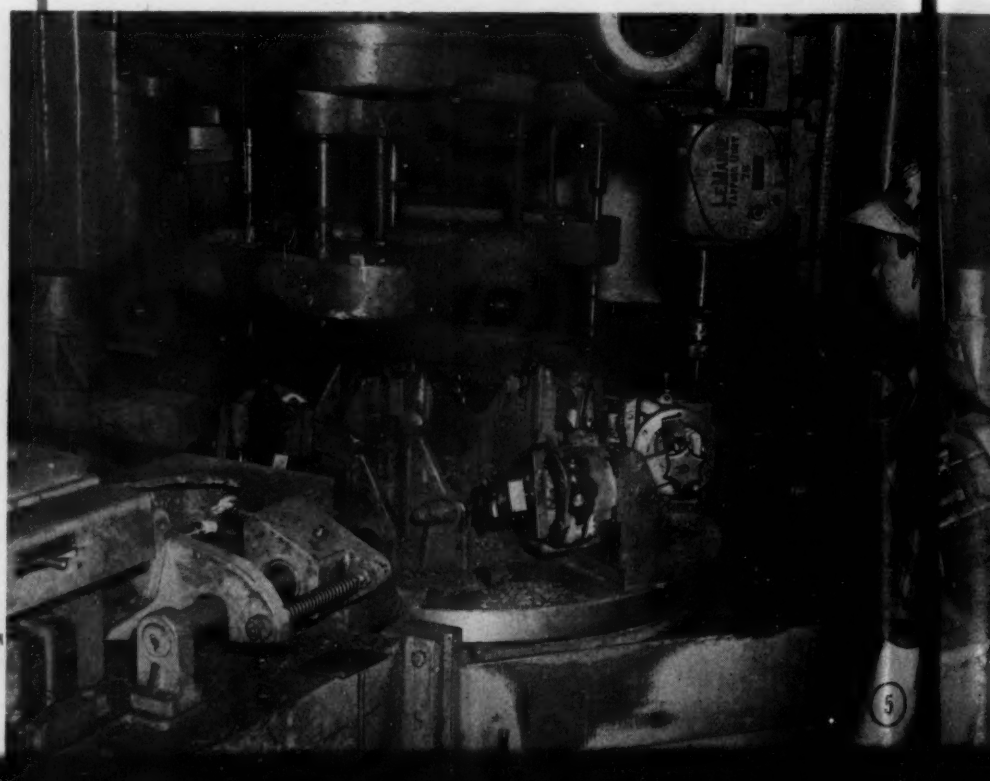
When cuts just mentioned are completed, carriage retracts automatically and fixture automatically is indexed crosswise, an amount exactly equal to the distance from center to center of inner and outer

Fig. 5—Bearing retainer housings pass through five working stations on this machine, as in others of the same type, at the rate of 50 per hour while several drilling, reaming and tapping operations are performed

Fig. 6—Last of four LeMaire setups. Operations are similar to those in the others but apply to different holes or different operations in the same holes. Two side holes at an odd angle are drilled and tapped

Fig. 7—The rear pump casting shown here has both concentric and eccentric surfaces that are finished to very close limits by tools in the three spindles of this Excello boring machine, using the two-place fixture at the right

Fig. 8—At this station on a Bullard Mult-Au-Matic, special eccentric head driven by planetary gears makes eccentric cuts. Drive of the head is from chuck through pin that fits the mating slot in the plunger at top left



spindles. This maneuver brings the casting on which eccentric cuts already have been made, into line with center spindle. Then when the carriage advances again, concentric cuts are made, thus finishing this particular piece.

At the same time, the casting on which concentric cuts were made first—this now being in position opposite the outside spindle that was idle before—advances into the tools on this spindle and eccentric cuts are made. When carriage backs off, two castings, each having both sets of cuts completed, are ready to be unloaded. Castings as they appear before and after machining are shown on bed of the machine in Fig. 7.

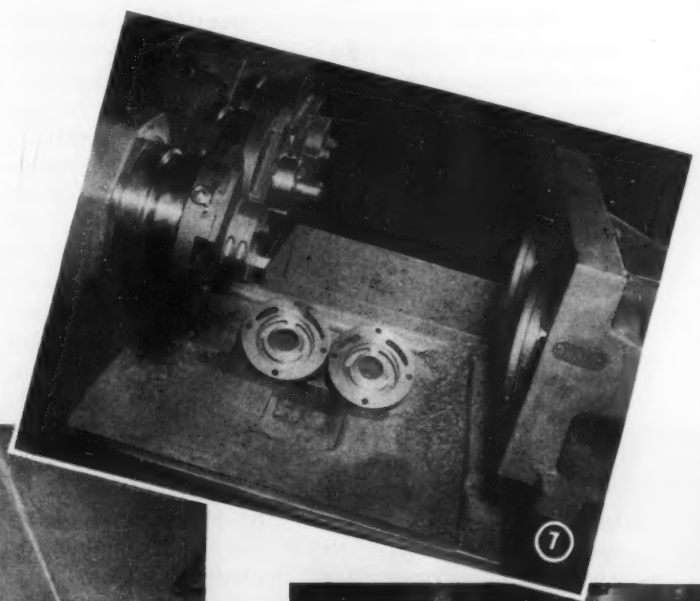
There is no cross feed while tools are cutting and furthermore the flange face is too wide to be finished satisfactorily with a single tool. Therefore facing is accomplished with two tools, one on an outer spindle, the other on the center spindle. Actually these tools overlaps slightly but their cuts are made with such precision that resulting surface is flat and no sign of overlapping cuts is noticeable. Tools that face bottom of the groove also overlap. Distance between the two faces commonly is held within 0.0003-inch although plus or minus 0.001-inch is the allowance on the drawing.

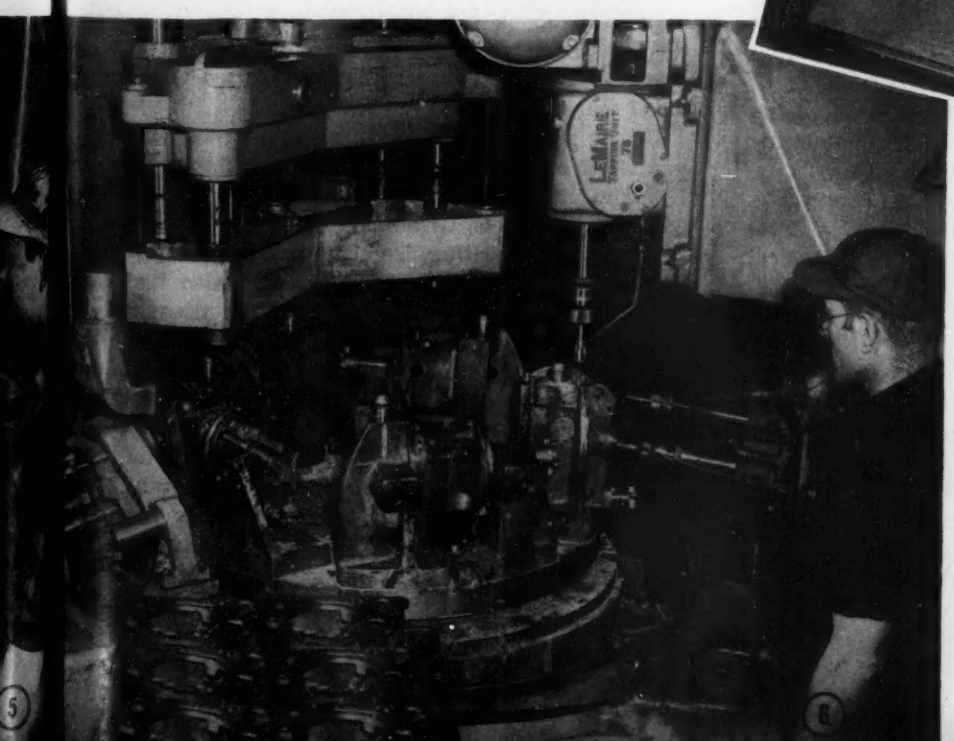
Eight-Spindle Machine Used—Rear pump castings, finish machining of which was just described are similar to front pump castings as far as flange face, crescent and eccentric portions are concerned. Rough machining of the corresponding surfaces on the latter is done on an 8-spindle Bullard Mult-Au-Matic. One station of this machine as setup for front pump body is shown in Fig. 8. This is of special interest because of special planetary drive arrangement of cutter head.

In all stations of this Bullard machine, castings are of course chucked and rotated concentrically in their respective chucks. Inasmuch as the cutter spindles revolve on the same axis, tools attached rigidly to them cannot make eccentric cuts. It is possible to make eccentric cuts, however, if the tool holder can be given an eccentric motion in exact synchronism with the revolving chuck which carries the work.

Stated briefly, this feat is accomplished by the following expedients. First, by providing an offset head driven by planetary gearing. Second, by positively locking the spindle (which drives the head and is concentric with the chuck) to the chuck, the spindle being disconnected from its normal drive. Second requirement is met by engaging a pin, which has a flat face milled on its upper end and which is attached to the chuck, in a mating slot in a plunger carried in the cutter head. End of plunger and pin show clearly in Fig. 8, as also do the casting being machined and cutters that produce eccentric hole and slot in this casting. Concentric portions and face of the flange, as well as lower face inside crescent, are rough machined at other stations of this Bullard Mult-Au-Matic, in the conventional way.

After passing through this Bullard machine, the front pump castings are ready for final finish machining in a setup which to all intents and purposes can be described as duplicating that on the Excello machine shown in Fig. 7 in connection with the similar rear pump components.





SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

WHOSE RESPONSIBILITY? Since writing the "essay" entitled "Servicing Machine Tools" which appeared on page 89 of the April 11, 1949, issue of STEEL, I have had several interesting confabs with machine tool men on this important subject. One and all, they want to do the right thing by their customers. At the same time, they do not want to see their modest profits drained away over the years by service demands beyond the bounds of reason.

One important point which has been brought out is the growing extent to which machine tools are becoming "assembled jobs"—even though the basic structure is, as it always has been, the creation of the machine tool builder himself.

In the simple days of not so many years ago, any machine tool builder who had a foundry, made about everything except shafting, spindles, belts and countershafts. Some of them even made the spindles of cast iron, as in the case of early model Fay automatics.

To run over the list briefly, bearings were "homemade" of cast iron, bronze or babbitt metal; gears were cast iron; feed works were mechanical—and homemade; main drive and some secondary drives were by flat belts with simple shifter controls; clutches (if any) were homemade; lubrication largely was by oil holes and oil can; chucks in many cases were homemade; coolant systems (if any) were simple "plumbing" jobs, often with gravity feed; and chip removal consisted of sweeping the floor.

This list could go on and on, but the point I want to make is that in modern machine tools all these things and many others are the products of highly organized outside specialists. They make ball, roller and needle bearings; heat treated alloy gears; hydraulic feed systems, electrical drive and control apparatus; multiple disk and magnetic clutches; automatic lubrication systems; chucks and feed fingers; coolant systems—including pump, filters and sometimes refrigeration, and conveyors and suction systems for continuous chip removal.

This list too could go and on. As a matter of fact it constantly is growing. The big question is—and this question rapidly is growing in the minds of many machine tool builders—who is responsible for servicing this multiplicity of "outside designed and outside manufactured" mechanical, hydraulic and electrical apparatus and gadgetry which have become incorporated into modern production machine tools?

Most machine tool users assume that it is up to the machine tool builder "to service the whole works"—and to do so on extremely short notice. The machine tool builders have accepted this responsibility.

Many of them now, however, have reached a stage where they will have to call upon their suppliers for help. The alternative seems to be either higher initial prices for machine tools to cover increased service demands or much higher fees for service calls. There is no possibility of leaving off the refinements.

Suppliers can do much to ease the strain on the machine tool builders by volunteering to service the things which they contribute to machine tools—electrical and hydraulic apparatus in particular. Some of these suppliers are big companies with branches scattered far and wide. They are in a position to give the machine tool industry a helping hand not only in this country but also in foreign lands.

CARBOLOY TOOL MANUAL: Last November my friend Athel Denham of Detroit gave me a tip that four years of work at Carboloy Co. Inc., on what he described as "a manual to end all manuals—at least on single point carbide tools," rapidly was nearing completion.

A completed copy of this manual now has been presented to me for review. It certainly comes up to expectations, not only as to the wealth of useful material which it contains but also as to the unique and "get-at-able" way in which this material is presented.

This 5½ x 8⅛-inch book, bound in flexible covers, has 192 pages. So much for the cold statistics. More important to the man who uses it is the "slide film" technique employed in presenting more than 700 photographs and drawings. These clear, 1¾ x 1⅜-inch illustrations are set in strips down the center of the page. Terse, caption-like text is set in blocks beside the pictures—that at the left in bold face type being of primary interest, that at the right in smaller type being more of background interest.

Despite the tremendous number of facts in this book, it is not necessary to go after any desired fact as though looking for a needle in a haystack. Not only is the book completely indexed, but by setting up this index in "the language of questions," any one of the 3000 "answers" can be spotted with little or no searching.

Briefly stated, the ten sections into which the book is divided cover respectively: Design, Chip Breakers, Recommended Grades and Speed Selection, Brazing, Grinding the Tools, Grinding Chip Breakers, Application, Trouble Shooting, Tool Control and Method Selection, and Inspection of the Tools. Also included are: Nomenclature diagrams, tables for determining speed, feed and depth of cut on ferrous and nonferrous materials, carbide grade selection charts and nomographs for determination of proper tip thickness, shank size, nose radius, etc.

I recommend this book highly, especially to production and tool engineers. If you definitely can identify yourself as being in a supervisory position by making official application on your company's letterhead, a copy will be mailed free of charge. Write to: Carboloy Co. Inc., Detroit 32, Mich., requesting "Carboloy Tool Manual No. 191."

HOW TO STOCK

Motor Maintenance Parts

By WILLIAM G. HALL
Manager
Renewal Parts Department
Reliance Electric & Engineering Co.
Cleveland

Maintenance efficiency can be stepped up and equipment down time cut by stocking complete replacement units or essential components of electric motors. Effectiveness of any spare parts program depends upon several factors discussed here

IN industry's efforts to maximize productivity and keep output high by minimizing equipment outage resulting from electric motor failures, the value of systematic maintenance has gained increasingly wider recognition among manufacturers in recent years. For example, periodic check-ups and proper lubrication are generally regarded and accepted as standard principles and practice of good motor maintenance.

With mechanization of processing lines presently continuing to increase, production management and plant maintenance men are focusing more attention on the stocking of adequate replacements for motors driving essential machines. This concept is a logical corollary to the precept of scheduling vital maintenance work on a systematic basis.

Before exploring at close range the economics and mechanics of the idea that protective stocks symbolize good insurance against costly production delays, it should be pointed out that there are no inflexible rules of parts stocking providing equal application to all cases. Buying repair parts for stock can be likened to purchasing insurance. Stripped to their basic essentials, the feasibility and desirability of stocking repair parts, along with quantities to carry, depend on your answers to certain questions: How expensive is machine outage to you? How much insurance against equipment downtime do you want? 100 per cent? Or 10 per cent?

Related and supplementary considerations are, of course, involved in ascertaining the advisability of a spare parts stocking program. Among these factors are:

(1) Relative importance from total usage and stoppage standpoints of individual machines or groups of related units, to overall plant production

(2) Specialized equipment used in product manufacture

(3) Initial equipment cost and investment required for stocking replacement parts

(4) Stocks maintained and delivery service provided by suppliers

(5) Storage space available for spare parts at point of use.

All these factors, quite obviously, vary widely from one plant to another; hence, no two may be said to be exactly alike. Repair parts and quantities stocked by one plant may easily fall far short of satisfying the maintenance requirements of another. Again, one plant's stock may constitute an excessive inventory and investment for another.

In its new Ashtabula, O., plant, as with the company's four production facilities in Cleveland, Reliance has taken a liberal dose of its own medicine to promote and maintain maximum productivity. The Ashtabula facility, in fact, offers an excellent illustration of a modern plant utilizing modern maintenance stocking of both electrical and nonelectrical repair parts based on actual needs to minimize the effects of the equipment outage factor.

Plant equipment at Ashtabula may be divided, for

Fig. 1—For protection, visibility and easy identification, small renewal motor parts are packaged in moisture-proof, transparent cellophane bags, which are then shipped in folding boxes or corrugated cartons

STOCK CONTROL RECORD

PART NAME STARTER COIL			PART NO. 1732 X 5		USED ON ½ TO 5 T CRANES NO. 1232, 1561, 1622, 1763, 1937				RECORDER POINT 5
SUPPLIER SQUARE D					PRICE EACH $2.95 IN LOT OF 10 DELIVERY TIME 2-3 WEEKS				STOCK LOCATION 7-H-3
DATE	QTY.	MACH. NO.	REQN. NO.	INVENTORY	DATE	QTY.	MACH. NO.	REQN. NO.	INVENTORY
7/20	10	—	17632	0					
8/6	10	—	"	10					
8/17	1	1763	—	9					
8/27	1	1931	—	8					
9/6	1	1232	—	7					
10/2	1	1561	—						
10/17	1	1232	—						
10/17	10	—							
11/2	10	—							

Fig. 2 — Purchase and stock control is essential in any maintenance stocking program. This typical record shows reorder time, storage location, quantities, usage of parts and other pertinent information

the sake of simplicity, into the following seven groups principally:

(1) Materials handling units
(2) Critical production equipment
(3) Machine tools and other production units
(4) Utility service apparatus
(5) Portable tools
(6) Testing equipment
(7) Ventilating equipment

Materials Handling Units—Ninety-five motor-driven jib hoists of from 250 to 2000 pounds capacity and 11 electric-powered transport trucks serve individual machine tools and work stations. Five overhead cranes of from 4000 to 10,000 pounds capacity handle bar stock, sheet steel and other bulky materials. Operation of the whole plant depends on these units.

Complete interchange assemblies are carried, depending on the tool the hoist serves. For example, a 2000-pound hoist serving the tool room surface grinder, has its own spare; on machine tools in the machine shop, the ratio is one spare to every 5 to 10 tools. A minimum stock of five hoist units is maintained for immediate replacement at all times, with five in the process of repair, reconditioning and restocking. For cranes, motor bearings, brushes, mechanical parts, cable and control parts are stocked.

Critical Production Equipment — The classification comprises three units: A specially designed, electrically heated oven for varnish-dipping and baking of motor stators and armatures; an electric induction melting furnace for melting aluminum used in rotor casting, and three dynamic balancers. In each instance equipment must be maintained in continuous operation to keep the production stream flowing smoothly; if a unit breaks down, a bottleneck quickly develops.

Baking oven is equipped with 23 motors—nine units for operating the blowers, six for the oven doors, two for varnish circulating pumps, two for hydraulic lift and control, three for the conveyor, and one for the oven exhaust. Motors for doors, circulating pumps, hydraulic lifts and controls, and the conveyor are of special types designed to operate with gear pumps and gear reducers. Altogether, there are six types of alternating-current motors of three different sizes, ranging from ½ to 10 horsepower; for each type, one spare motor is stocked.

The aluminum melting furnace is electric, but a gas-fired unit is maintained for standby service; however, since the electric furnace provides greater operating economy, uniformity of results, and control of quality, every effort is made to utilize this unit full time. Consequently, a complete air-circulating unit and complete refractory assembly as well as recording motor parts are stocked for this furnace.

A balanced supply of repair parts is stocked for the dynamic balancers, minimum levels being five electronic tubes, two sets of pick-up switches and coils, and one complete set of indicating instruments.

Machine Tools and Other Production Units—Stocking of replacement motors for machine tools depends primarily upon types and number of machines used. For example, no spares are carried for 12 turret lathes for two reasons. First, motors on these units are protected, either by motor construction or manner of location in machines; and second, loadings for processing parts on these machines can be transferred from one to another in the case of a breakdown, providing unusual flexibility in production scheduling and operation. On the other hand, a complete special motor-generator set is stocked for two engine lathes, this because of their greater importance, since both units must be kept in continual operation.

Again, a gas-cutting machine—the only one in the plant—has a special motor. A spare motor is stocked for this unit. In direct contrast, no complete spare motors are carried for 12 arc welders; but for these, three complete sets of carbon brushes, bearings and control parts are stocked. In the case of drilling and tapping machines and grinders, spares are carried only for those units on which a specially-mounted motor is built into the machine frame.

Utility service equipment includes two oil-fired package unit boilers (200 and 300 horsepower); a 75 horsepower vertical low-speed type air compressor; control valves, and door-closing devices. A spare blower motor is stocked for the two boliers, and an assortment of parts (valves, rings, gaskets, proportioning and regulating valves, etc.) for the remaining equipment. Five complete sets of rotors and valves are stocked for 28 pneumatic tools, such as chip hammers and grinders, and from two to five sets of armatures and field coils, brush holders and switches for 32 electric tools. Twelve complete portable tools are available in the tool crib for use at all times.

Testing Equipment—The testing department uses 12 motor-generator sets for production-line motor-testing. Bearings, armatures and field coils, control parts, etc., are not stocked for these units because in Reliance's case, replacement units can be withdrawn from production or from the renewal parts department as needed. One spare motor is stocked for ten motors in the ventilating system. One complete set of washable viscous-type filter panels (30 to a set) is stocked for the entire system, which has 300 panels.

From this concise review of the replacement parts stocking program, it becomes clear that the answer to the question of whether to carry a complete spare unit or a group of parts for any piece of equipment is determined largely by its relation to plant operation. Where motors or other parts are special purpose in nature, complete interchange assemblies are stocked to minimize machine outage. Motors for the varnish-dip-and-bake oven and the gas-cutting torch are good examples of this. (*Please turn to Page* 132)

EFFICIENT HANDLING METHODS Can Cut Production Costs

Fig. 9—Roller conveyors and continuous chain conveyors equipped with cradles simplify materials handling problems in the manufacture of laminations for rotor cores at General Electric's new Tiffin, O., plant. Courtesy The Austin Co.

Conveyor applications in the metalworking industry are widespread and diversified, utilizing all kinds of conveying equipment including chain, roller, apron, and belt types. In many plants conveyors form an integral part of the production processes

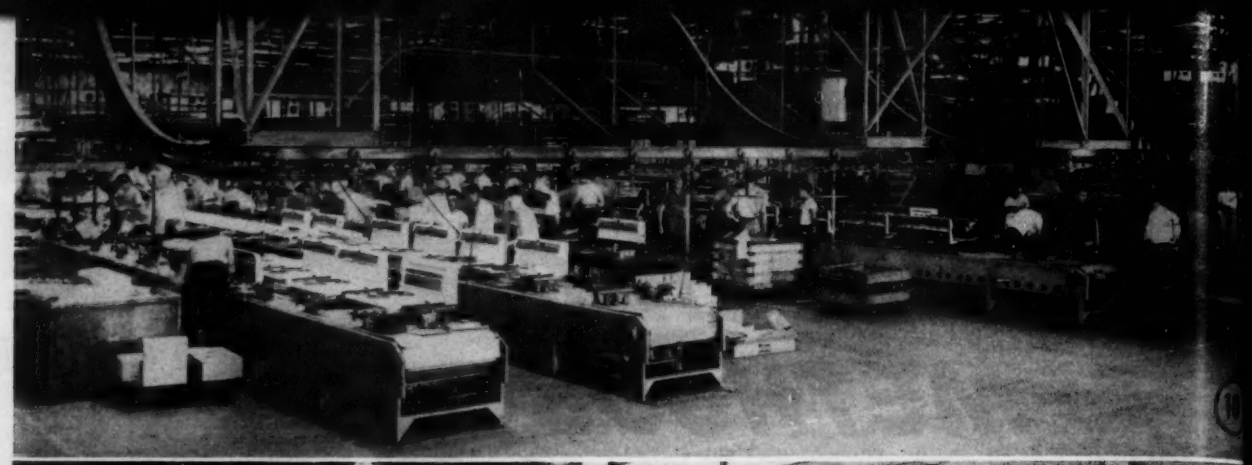
By WALTER F. TOERGE
Associate Editor, STEEL

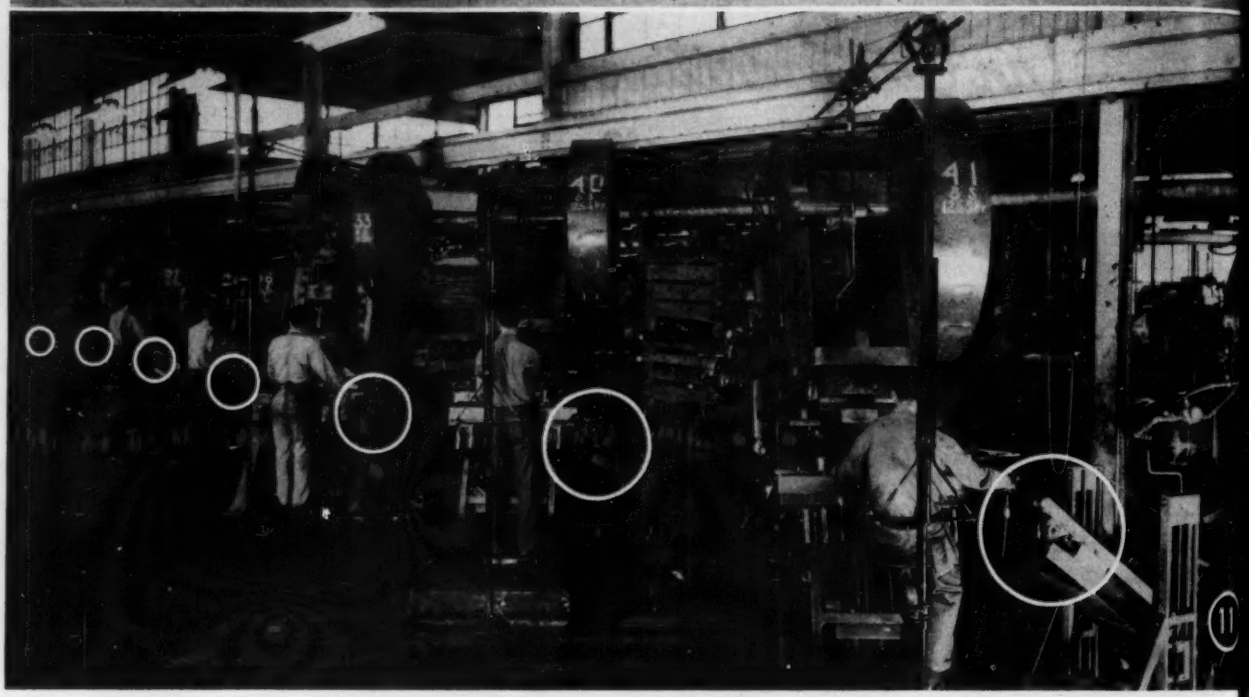
Part II of the current series

VOLUME and standardization of loads are the two principal requirements for using conveyors where materials must move continuously over fixed lines of travel between fixed points. To fulfill the many needs for this type of service in a multiude of applications, conveyor manufacturers have developed a wide variety of gravity and powered types including chain, roller, apron, belt, in portable and stationary models. In many plants, it is almost impossible to separate conveyors from the other manufacturing equipment. Conveyors have become, in many metalworking operations, an integral part of the production processes.

Henry Ford is usually credited with putting the basic idea of assembly in motion to work in the manufacture of automobiles. He installed the first conveyorized assembly line in 1912. Prior to that time, conveyors were used almost exclusively in moving bulk materials such as grain, coal, cement. Origins of conveyor use in this country can be traced back to the 18th century.

Raw materials such as coal, various kinds of ore, limestone upon which the





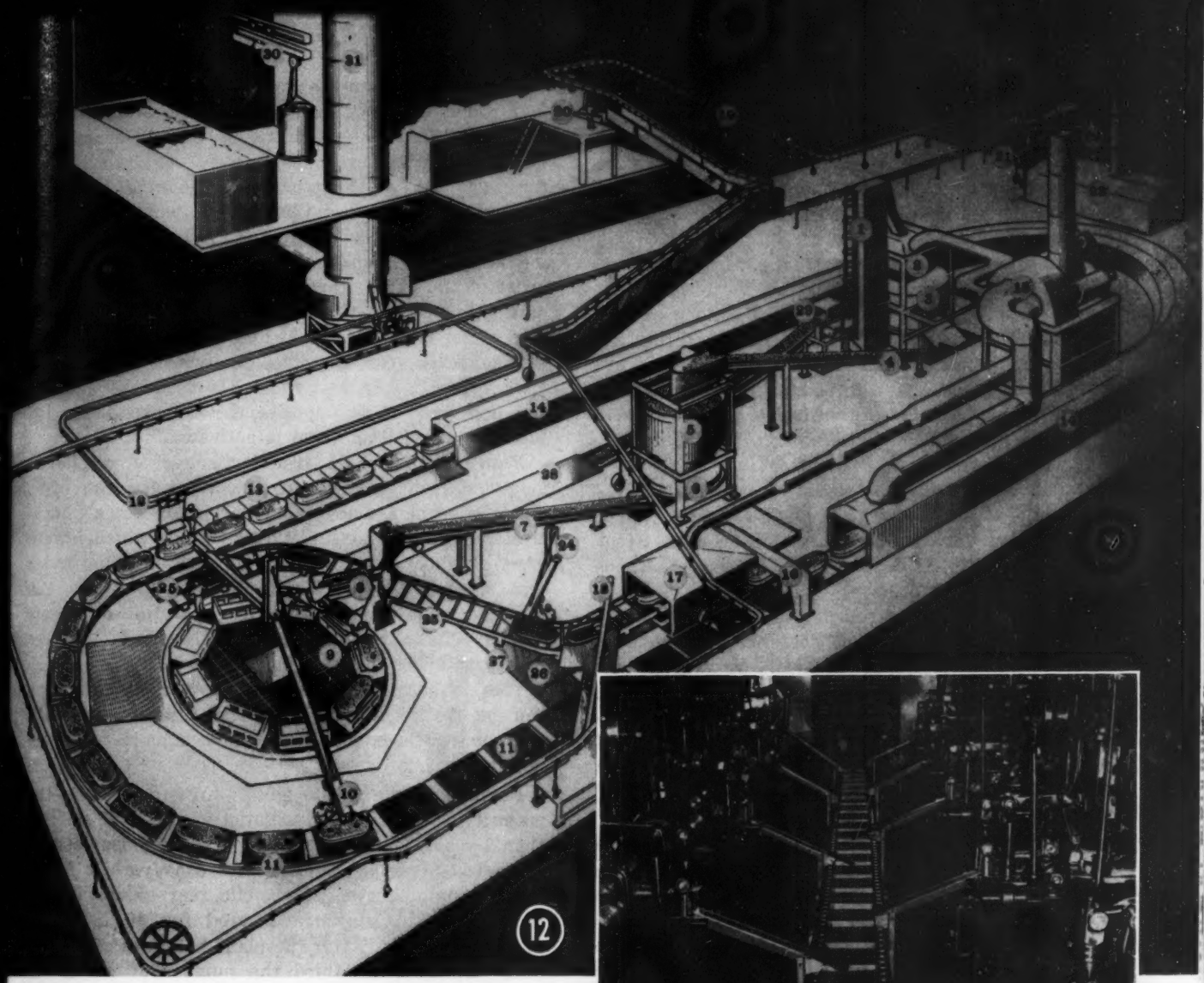
metalproducing-metalworking industry is dependent continue to be carried by belt conveyors and bucket elevators. (STEEL, Feb. 14, 1949, p. 60)

Shaker, vibrating and oscillating conveyors in a wide range of capacities have been used here and abroad for many years. Oscillating conveyors find their best field of application in handling hot or abrasive material such as hot foundry sand and castings. In a typical installation of an oscillating type conveyor turnings, metal chips and coolant are collected from several batteries of automatic machines and carried to the coolant separator. Some of these conveyors also convey heavy scrap parts in a separate compartment next to the turnings.[8]

Effects on Productive Payroll—Getting back to the automobile industry, which provides a natural field for maximum conveyorization, it is pointed out that while the first objective in utilizing industrial conveyors was to reduce nonproductive labor payroll, these production aids have had far-reaching effects upon productive payroll. This result did not necessarily mean a reduction in the labor payroll, except indirectly by greatly increasing the worker's productivity. More cars were produced without adding workers. Conveyors gradually became a part of the general manufacturing scheme. They now serve many of the transportation needs within automobile plants, including receiving, storing, distributing raw materials and parts, various processing operations such as heat treating, plating, painting etc., subassembly and final assembly.[9]

Because everything moves over predetermined routes and operations are carefully synchronized and timed, an accumulation of banks of materials stored on the floor or in containers is almost entirely eliminated. Work-in-process inventory is consequently reduced and general housekeeping greatly improved. Cost reduction and manufacturing efficiency are aided without cutting workers' earnings. In fact, many plants presently enjoy the lowest unit labor cost combined with the highest individual worker earnings, which, of course, is a very desirable situation.

Foundry Mechanization—In foundries, about 10 tons of sand must be handled to produce every ton of castings. A semiskilled workman, with conveyors and other mechanical devices can make six to ten times as many and better castings than a skilled workman could turn out formerly, using hand methods. In the case of a midwestern malleable foundry, for instance, the plant formerly produced about 3000 tons of malleable castings per year, with approximately 110 man hours per ton; average casting weight was 0.409-pounds. This was a typical manually-operated shop, turning out small and medium



1. Sand Elevator
2. Storage Hopper—Sand
3. Speed Muller
4. Belt Conveyor—Muller to Storage
5. Sand Storage Hopper
6. Sand Feeder
7. Belt Conveyor—Feeder to Sand Slinger
8. Sand Slinger
9. Turntable
10. Mold Flask Jib Crane
11. Mold Pallet Conveyor
12. Pouring Ladle Monorail
13. Moving Pouring Platform
14. Pallet Conveyor Hood
15. Cooling System
16. Pneumatic Mold Pusher
17. Shake-out
18. Unloading Monorail
19. Cooling Monoveyor
20. Sprue Disposal
21. Unloading Crane
22. Sandblast Monoveyor
23. Sandblast Unit
24. Flask Jib Crane
25. Flask Return Conveyor
26. Shake-out Apron Conveyor
27. Belt Conveyor—Return Sand—from Shake-out
28. Belt Conveyor—Return Sand—from Turntable and Shake-out
29. Magnetic Pulley and Gyratory Screen
30. Cupola Charger
31. Cupola

sized castings. Molders poured their own molds from metal melted in a batch furnace.

The modernization and mechanization program provided for 36 melting stations with mechanical handling for all sand, molds and castings. After being poured on the conveyor, molds are dumped and then delivered to a shakeout which separates sand and castings. Castings then move into a wet mill and are automatically cleaned and sent on to sorting conveyors. At this point, the castings are placed in containers and transported on roller conveyors past the inspection station and over scales where they are weigh-counted; castings then move on to the grinders. From the grinders, in the same containers, they are ready for annealing.

Formerly, castings were dropped on the floor 12 times during processing. Under the new conveyor-

Fig. 10—Four 80-foot steel belt conveyors move electric range top assemblies at a speed of 6 fpm during assembling operations. Courtesy Sermat Conveyor Division, Peterson Products Corp.

Fig. 11—Seven portable conveyors carry material from blank to finished stampings in this tool and die shop. Courtesy May-Fran Engineering Inc.

Fig. 12—In the mechanized production of brake drums and shoes in this foundry setup, all except three of the operations are confined within the molding conveyor loop, 127 feet long and 32 feet wide. Courtesy Mechanical Handling Systems Inc.

Fig. 13—Continuous hinge type apron conveyors with automatic discharge spouts transport scrap from presses to cars or trucks. Courtesy Alvey-Ferguson Co.

ized setup they never touch the floor. They are picked up by hand only when some operation is performed on them. Net overall result of the new processing arrangement has been to permit the foundry to produce castings averaging 0.42-pounds at the rate of 6000 tons per year with an average of 74 man-hours per ton.[7]

Automatic Conveyors—A system used in one plant to convey individual brass bars of various widths, 9.9 to 20.5-inches, approximately 30 feet long and ½ to ¾-inch thick presents some rather interesting examples of specialized conveyor design and engineering difficulties which had to be overcome.[10] Coupled with the construction features of the conveyor itself is the use of limit switches, phototrollers, relays, timers and other electrical equipment.

A stack of brass bars is placed by crane on a 22½-foot long, 5-strand heavy pack chain conveyor. Chain on this 6-inch pitch roller chain is spaced on 4-foot centers. A 20 hp, 1160 rpm, type CSP induction motor drives the conveyor.

This conveyor is controlled manually by a push-button station, allowing for clearance for the next stack, until the conveyor is filled. A vacuum unstacker next places bars individually on a 60-foot chain-driven live roller conveyor with 4¼-inch diameter rollers, 30 inches long on 12-inch centers. Speed of this table, driven by a 3 hp, 1100 rpm motor is 200 fpm. The bar rolls over this conveyor to the first of two tandem 2-high mills. From this mill, the bar travels at 200 fpm on a 25-foot long chain-driven live roller conveyor to the second mill. A 53-foot chain-driven live roller conveyor operating at 250 fpm receives bars from the second 2-high mill.

At this point bars are rerouted back through the mill for several more passes. Since the bar must be held horizontal and returned automatically to the first 2-high mill, right angle transfers are required at four points.

Some means had to be found to compensate for various bar lengths. To minimize the distance a bar travels in returning to the mill, the right angle transfer is operated by the rear end of the bar, leav- the operation independent of the length of the bar. Light beam of a phototroller is intercepted as the bar emerges from the mill, setting the automatic electric controls in operation, energizing some of the rolls and stopping others.

Feeding bars from the chain conveyor to the return live roller conveyor presented other problems because of the unequal widths of bars. Several pin wheels 18 inches in diameter were constructed, one for each bar width; pins were mounted on these wheels, so spaced that this spacing would represent the bar width plus clearance. Wheels were then mounted on a common shaft driven from the head shaft of the chain transfer conveyor by a chain and sprockets. Pin on the wheel operates an adjustable dog which trips a limit switch. When 12-inch bars are conveyed, for example, the wheel with a pin spaced for 12-inch bar widths is used. By moving the dog until it is opposite the corresponding 12-inch pin wheel, the wheel is activated.

Bars on the chain transfer conveyor discharge singly at right angles onto the live roller conveyor. Front edge of a discharging bar intercepts a phototroller light beam, completing a circuit which lowers a set of wheel arms operated through an air cylinder and solenoid valve. When the bar intercepts the light beam, it also prevents the operation of an air pusher at the receiving end of the chain transfer conveyor.

This is but one example of how conveyorization can be combined with electrical controls to make some materials handling operations almost completely automatic.

Possible Savings — Original investment in the majority of conveyor installations is paid off in less than 2 years, many in a matter of months. One classic example of possible savings with conveyors is found in the production of automobile rear axles. Before conveyors, 350 workmen labored for 16 hours to make 1700 axles. After the plant had been conveyorized, less than one-third the number of men, 109, turned out nearly four times the previous number of axles, 6700—and in less than half the time, 8 hours.[11]

Savings in time and space are sometimes of critical importance. In one household appliance plant, portable roller skate conveyor used with adjustable boosters is of great value in handling cartoned material at the receiving department. By adjusting the conveyor to a convenient working position for the operator in the truck and by changing the booster elevation as the pile grows, only two men are needed to unload and store a full trailer load of die castings

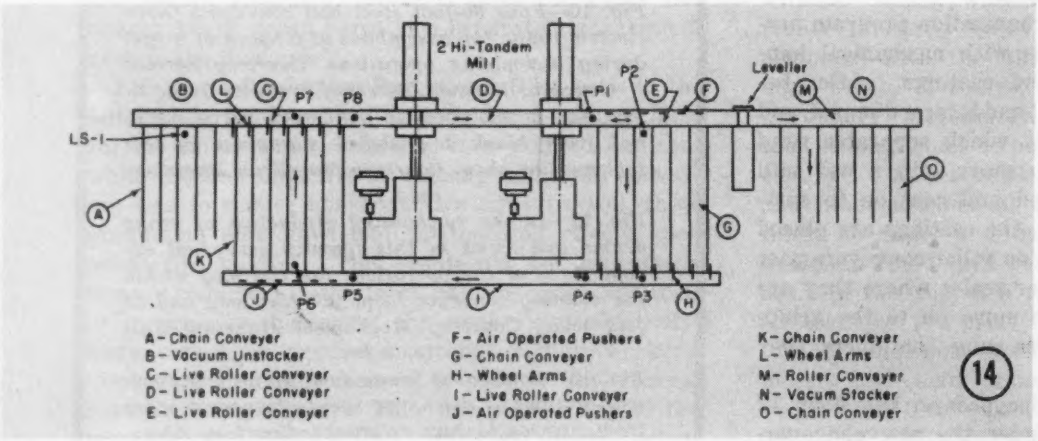
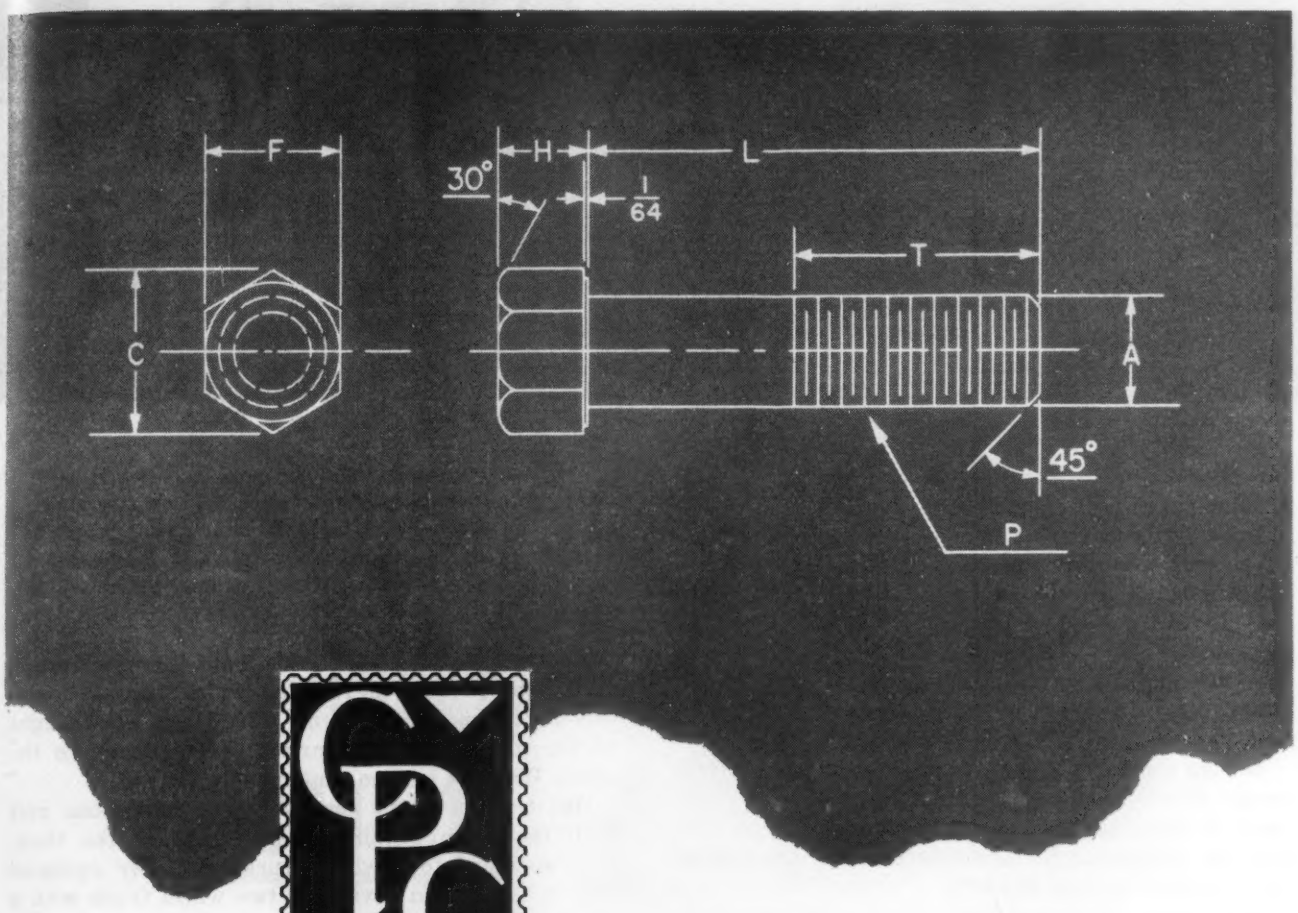


Fig. 14—Conveyor system for transporting brass bars of different widths. See reference 10. Courtesy Mathews Conveyer Co. and Westinghouse Electric Corp.

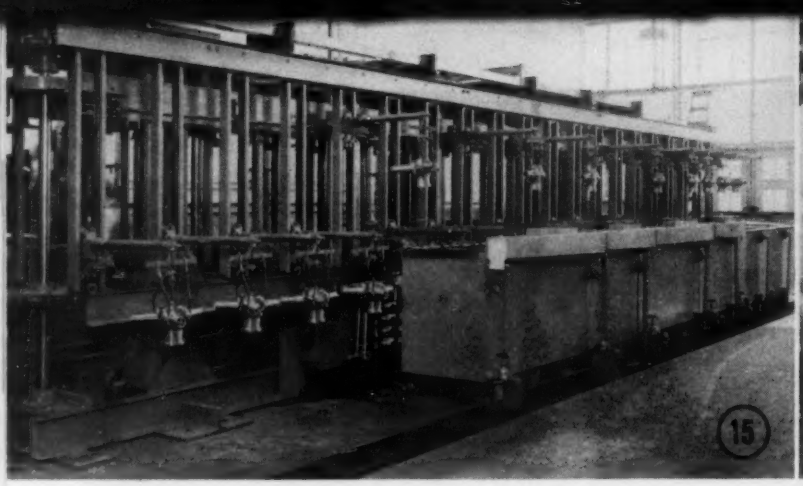


The Chandler stamp of quality

This quality has been acquired over a period of almost 20 years. It is the result of able management, teamed with skilled personnel operating modern high speed equipment in a completely up-to-date plant. It is the mark of the precise cold wrought basic industrial specialties that

CHANDLER manufactures in many designs, and according to individually exact specifications, for practical purposes.

CHANDLER PRODUCTS CORP.
1491 CHARDON RD. CLEVELAND 17, OHIO



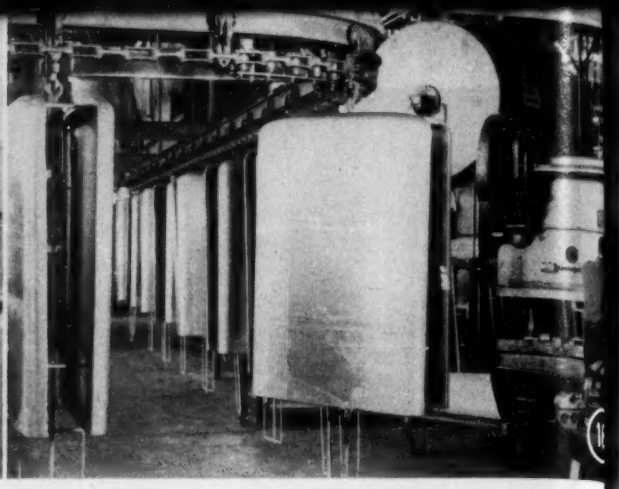


Fig. 15—Conveying facilities form an integral part of full automatic plating equipment. Courtesy Hanson-Van Winkle-Munning Co.

Fig. 16—Trolley conveyor handling refrigerator doors beside presses. Courtesy Link-Belt Co.

or other cartoned materials in a matter of only 30 to 35 minutes.

Prior to conveyorization and palletization the job of packing and shipping accessories and supplies to the company's many branch offices used 9000 square feet of floor space and 33 men. By installing caster-equipped baskets, pitched roller skate conveyors, fast-weighing dial scales and pallets for the finished packages, this operation was performed with 14 men and in an area of 1800 square feet.

During assembling operations in a modern electric range plant, four 80-foot steel belt conveyors are used to carry new range top assemblies. Speed of 6 feet per minute allows adequate time for assembling the electrical controls precisely.

Integration—Electroplating installations are excellent examples of how conveyors can be integrated with other facilities to form complete production units. An elevator type full automatic electroplating machine manufactured by one company[12] is designed for processing heavy loads ranging from 10 to 225 pounds. Work is supported by a horizontal arm which is raised and lowered in a vertical plane, the arm remaining horizontal to the line of travel. Devices such as racks, shallow trays, baskets or barrels carrying the work are attached to these arms.

Another form of automatic plating machine is the return type which loads and unloads at the same station. All operations in the plating cycle are performed continuously and automatically: Cleaning, rinsing, plating and drying. Present installations of one model range in size from 25 to 175 feet long and include as many as 30 treating operations. The machines are applicable to many types of work including precleaning for paint treatments, anodizing, electroplating in copper, nickel, chromium, brass, zinc, cadmium, gold, silver, etc.

A straight line type, made by the same company, handles very high lifts of long pieces, such as complete aircraft wing sections through necessary pretreatment and anodizing bath. On this conveyor, bathtubs, refrigerator liners, stoves, sinks, etc. are loaded at one end and unloaded at the other.

While many plating conveyors have certain fundamentals in common, they are usually engineered to fit specific products. Design of electroplating conveyors, or "full automatic plating machines" is as variable as the size, shape and design of the products they process.

Another instance of custom-built conveyorization is a high production foundry which uses a chain-driven core molding system. Core boxes are brought to the coremakers and carried automatically to the oven. Workers lose no time moving around.

One type of chain conveyor is a continuous unit with the chain running in a slot below the floor. Any standard four wheel truck or trailer equipped with a towing pin device, or two wheel truck with a special dolly, is used to carry boxes, packages, tote boxes, parts. When the pin is dropped into the floor slot, chain below the floor picks up the load. Systems of this type can be looped around to serve any area of the shop or storage area.

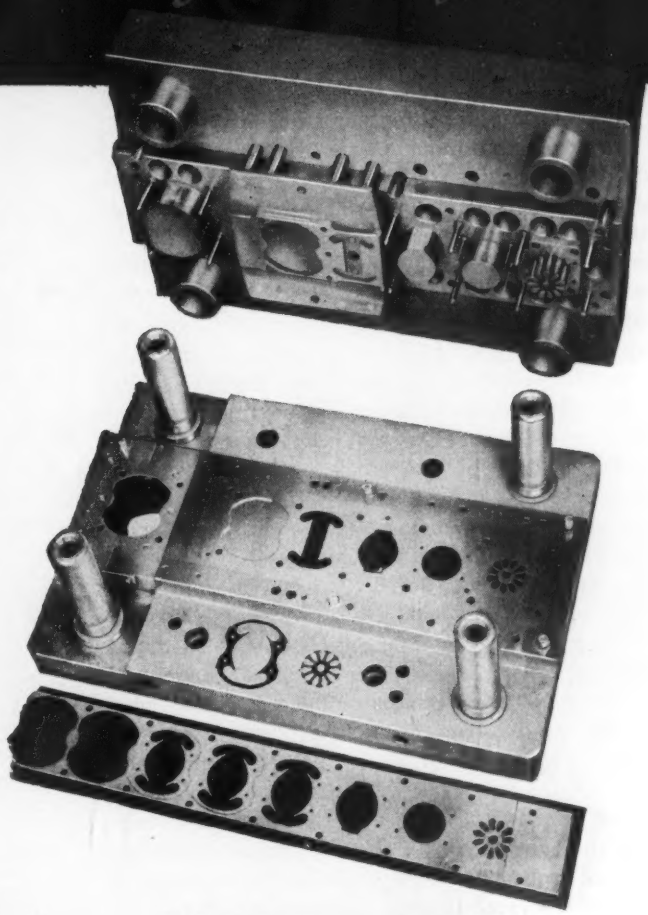
In another metalworking plant, a row of punch presses making parts through progressive operations are tied together by conveyors. As each job is completed at one press the part falls out of the back of the press to an inclined belt conveyor; this, in turn, discharges through a portable storage hopper with a front discharge from which work moves by gravity for the next operation. The cycle is repeated until parts are finished. Portable hoppers are used to take finished parts out at the end of the line.

Overhead Conveyors—Overhead or monorail conveyors fall into several conventional designs. One type consists of a continuous overhead monorail track carrying movable trolleys connected by some type of conveyor chain or cable. By means of suitable hooks, tongs, baskets, etc. work is suspended upon the trolleys, which are made up of a pair of ball bearing wheels of proper load capacity to operate on the upper surfaces of the lower flange of an I-beam track. Fork yokes and attachments connect the wheels to the conveyor chain. The track can be curved in the horizontal plane or turned up or down vertically. This type of materials handling system is capable of being engineered for practically unlimited flexibility .

Trolley conveyors are either suspended from the ceiling or mounted on integral floor supports. Applications in the metalworking industry, a few of which have already been mentioned, are almost unlimited.

"Worth Their Weight in Gold"

MEEHANITE® Die Shoes are TOUGH, ACCURATE, DEPENDABLE



BLANKING DIES, like those illustrated, are expensive precision tools—literally, in many cases, "worth their weight in gold." The Cleveland Form Tool Company, Cleveland, Ohio, specify Meehanite castings for such units. The die shown takes a 42-ton blow at 160 strokes per minute and can produce 5 million blanks before replacement.

Meehanite castings are manufactured under processes which permit accurate structural control of the metal, and thus the dependable achievement of the required properties for the job. They provide:

1. High Compressive Strength.
2. Adequate Shock and Vibration Absorption.
3. Dimensional accuracy under impact.
4. Freedom from "after-machining" distortion.
5. Density—Uniformity—Machinability.

Build "QUALITY" into your product with Meehanite Castings.

We have a Bulletin 28 entitled "7 Questions and Answers About Meehanite Castings" and if you would like a copy write to any of the foundries listed.

MEEHANITE FOUNDRIES

American Brake Shoe Co. — Mahwah, New Jersey	Fulton Foundry & Machine Co., Inc. — Cleveland, Ohio	Ross-Meehan Foundries — Chattanooga, Tennessee
The American Laundry Machinery Co. — Rochester, New York	General Foundry & Manufacturing Co. — Flint, Michigan	Shenango-Penn Mold Co. — Dover, Ohio
Atlas Foundry Co. — Detroit, Michigan	Greenlee Foundry Co. — Chicago, Illinois	Sonith Industries, Inc. — Indianapolis, Ind.
Banner Iron Works — St. Louis, Missouri	The Hamilton Foundry & Machine Co. — Hamilton, Ohio	Standard Foundry Co. — Worcester, Massachusetts
Barnett Foundry & Machine Co. — Irvington, New Jersey	The Henry Perkins Co. — Bridgewater, Massachusetts	The Stearns-Roger Manufacturing Co. — Denver, Colorado
E. Long Ltd. — Orillia, Ontario	Johnstone Foundries, Inc. — Grove City, Pennsylvania	Traylor Engineering & Mfg. Co. — Allentown, Pennsylvania
H. W. Butterworth & Sons Co. — Bethayres, Pennsylvania	Kanawha Manufacturing Co. — Charleston, West Virginia	U. S. Challenge Co. — Centerville, Iowa
Continental Gin Co. — Birmingham, Alabama	Koehring Co. — Milwaukee, Wisconsin	Valley Iron Works, Inc. — St. Paul, Minnesota
The Cooper-Bessemer Corp. — Mt. Vernon, Ohio and Grove City, Pa.	Lincoln Foundry Corp. — Los Angeles, California	Vulcan Foundry Co. — Oakland, California
Crawford & Doherty Foundry Co. — Portland, Oregon	Otis-Fensom Elevator Co., Ltd. — Hamilton, Ontario	Warren Foundry & Pipe Corporation — Phillipsburg, New Jersey
Farrel-Birmingham Co., Inc. — Ansonia, Connecticut	Pohlman Foundry Co., Inc. — Buffalo, New York	
Florence Pipe Foundry & Machine Co. — Florence, New Jersey	Rosedale Foundry & Machine Co. — Pittsburgh, Pennsylvania	

"This advertisement sponsored by foundries listed above."

Meehanite® NEW ROCHELLE, N. Y.

These include carrying parts from operation to operation; moving material from receiving docks to storage or from storage to subassembly (automobile plants); feeding final assembly lines; conveying parts through final assembly; transporting finished parts and assemblies to shipping dock; carrying all types of materials from floor to floor or from building to building; handling parts through degreasers, spray, dip or washing operations, through drying ovens or sand blast; cooling hot forgings or castings.

An overhead continuous power conveyor of rather unusual design uses a steel tube track through which specially constructed chain equipped with wheels in both the vertical and horizontal plane is propelled by a tractor type drive. Loads are suspended from pendants attached to the vertical wheel units. The vertical wheels roll on the bottom of the track on level applications and when going down inclined sections; these wheels contact the top of the track when going up. On horizontal curves, horizontal wheels roll on the sides of the track. Loads are always carried on the center line of the track.[13]

Equipment of this type is used for light handling where it is necessary to negotiate short radius horizontal and vertical curves, at slow speeds.

In a very compact finishing room a continuous power conveyor of the type described above takes the product through various operations prior to drying or finishing. The infrared oven in this department is attached to the roof trusses, releasing floor space below for other operations. Mounted on carriers operating in sections of track installed above the banks of lights, two sides of the oven can be moved in and out to vary the convection of the rays in keeping with the type of finish, shape and size of product.

Overhead trolley conveying equipment can be either powered or free rolling or a combination of the two. A manufacturer of refrigeration equipment, for example, rolls units out of ovens on unpowered rails by gravity alone to either automatically or manually controlled switches which feed the main power line. When the oven cycle time is completed, units move out onto the main line without stopping the conveyor.

(To be continued)

REFERENCES

8. L. O. Millard, Link-Belt Co., Chicago, "Developments in Bulk Handling," Materials Handling Conference, Philadelphia, Jan. 10-14, 1949.

9. C. L. Moon, Mechanical Handling Systems Inc., Detroit, "Conveyors—The Artery of Production," from a paper presented to the materials handling machinery manufacturers conference, Westinghouse Electric Corp., Buffalo, Nov. 8 and 9, 1948.

10. Stanley G. Smith, electrical engineer, Mathews Conveyer Co., Ellwood City, Pa., from a paper presented to the materials handling machinery manufacturers conference, Westinghouse Electric Corp., Buffalo, Nov. 8 and 9, 1948.

11. R. C. Sollenberger, Conveyor Equipment Manufacturers Association, Washington, "Conveying Machinery—A Basic Element of American Industry", Sept. 24, 1947.

12. Hanson-Van Winkle-Munning Co., Matawan, N. J.

13. Richards-Wilcox Mfg. Co., Aurora, Ill.

PARTIAL LIST OF CONVEYOR MANUFACTURERS

Ajax Flexible Coupling Co.
Westfield, N. Y.
Allis-Chalmers Mfg. Co.
Milwaukee 1, Wis.
Alvey Conveyor Mfg. Co.
3201 South Broadway
St. Louis 18, Mo.
Alvey-Ferguson Co.
71 Disney St., Oakley
Cincinnati, O.
Anchor Steel & Conveyor Co.
2563 Bellevue Ave.
Detroit 7, Mich.
Barber-Greene Co.
Aurora, Ill.
C. O. Bartlett & Snow Co.
6200 Harvard Ave.
Cleveland 5, O.
Burch Corp.
Crestline, O.
E. W. Buschman Co.
Clifton & Spring Grove Aves.
Cincinnati 32, O.
Chain Belt Co.
1600 West Bruce St.
Milwaukee 4, Wis.
Continental Gin Co.
P. O. Box 2614
Birmingham 2, Ala.
Conveyor Systems Inc.
325 South California Ave.
Chicago 12, Ill.
J. B. Ehrsam & Sons Mfg. Co.
Enterprise, Kans.
Fairfield Engineering Co.
Marion, O.
Fairmont Machinery Co.
P. O. Box 1175
Fairmont, W. Va.
A. B. Farquhar Co.
425 North Duke
York, Pa.
Gifford-Wood Co.
Hudson, N. Y.
Godfrey Conveyor Co.
1703 13th St.
Elkhart, Ind.
Guide Co.
Canfield, O.
Hapman Conveyors Inc.
2405 W. McNichols Road
Detroit 21, Mich.
Honan-Crane Corp.
210 S. Wabash Ave.
Lebanon, Ind.
Hyster Co.
Portland 8, Ore.
International Conveyor & Washer Corp.
652 East Fort St.
Detroit 26, Mich.
Jeffrey Mfg. Co.
Columbus 16, O.
Kanawha Mfg. Co.
1520 Dixie St.
Charleston 26, W. Va.
Kewanee Machinery & Conveyor Co.
1642 Burlington
Kewanee, Ill.
Lamson Corp.
Syracuse 1, N. Y.
Link-Belt Co.
307 North Michigan Ave.
Chicago 1, Ill.
Logan Co.
1115 Franklin St.
Louisville 6, Ky.
Loudon Machinery Co.
183 Court St.
Fairfield, Iowa
Materials Handling Equipment Co.
5724 Armitage Ave.
Chicago 39, Ill.
Mathews Conveyer Co.
212 10th St.
Ellwood City, Pa.
Mechanical Handling Systems Inc.
4600 Nancy Ave.
Detroit 12, Mich.
Mercer-Robinson Co. Inc.
30 Church Co.
New York 7, N. Y.
Mesta Machine Co.,
P. O. Box 1466
Pittsburgh 30, Pa.
Metzgar Co.
412 Douglas Ave. S. W.
Grand Rapids, Mich.
Samuel Olson Mfg. Co.
2418 Bloomingdale Ave.
Chicago 47, Ill.
Palmer-Bee Co.
Westminster and G.T. R.R.
Detroit 12, Mich.
Pettibone-Mulliken Corp.
4710 W. Division St.
Chicago, Ill.
Rapids-Standard Co. Inc.
Peoples National Bank Bldg.
Grand Rapids 2, Mich.
Richards-Wilcox Mfg. Co.
Aurora, Ill.
Robins Conveyors Div.
Hewitt-Robins Inc.
Passaic, N. J.
Sandvik Steel Inc.
Conveyor Dept.
111 Eighth Ave.
New York 11, N. Y.
Screw Conveyor Corp.
700 Hoffman St.
Hammond, Ind.
Service Conveyor Co.
7764 Bryden Ave.
Detroit 10, Mich.
Standard Conveyor Co.
940 Indiana Ave.
North St. Paul, Minn.
Steel Parts Mfg. Corp.
Div. of Blackstone Mfg. Co.
226 S. Morgan St.
Chicago 7, Ill.
Stephens-Adamson Mfg. Co.
P.O. Box 272
Aurora, Ill.
Syntron Co.
Homer City, Pa.
Union Chain & Mfg. Co.
Sandusky, O.
Jervis B. Webb Co.
8951 Alpine Ave.
Detroit 4, Mich.

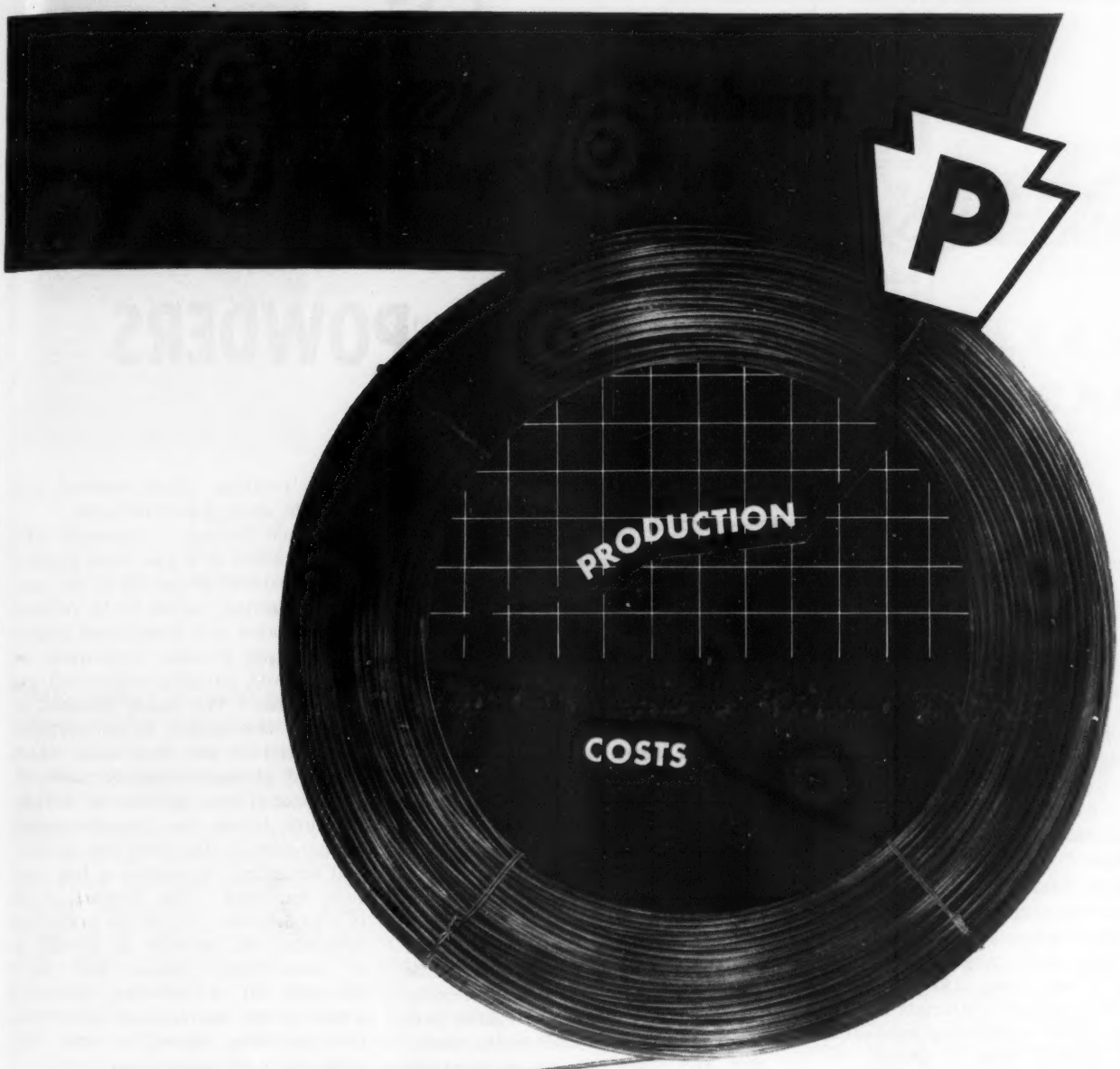
Material Swells to 100 Times Original Volume

Even lighter than some gases is a new plastic foam insulating material which swells up when baked like a cake to 100 times its original volume. Said to weigh from 10 to 20 times less than the meringue on a pie, the material was developed at the Westinghouse Research Laboratory after a 3-year search for an effective inflating material that would fill large areas, yet weigh next to nothing. It was developed by Robert F. Sterling who predicts that it may be used to insulate items ranging from soft-drink coolers to prefabricated metal houses and airplanes.

Foam is made by heating a molasses-like synthetic resin at about 350° F until it expands to 100 times its original volume, then solidifies. Thousands of gas bubbles entrapped in the foam gives the plastic its lightness. If foamed into prefabricated metal wall sections, a 2-inch-thick layer weighing only 300 pounds would be enough to insulate a complete six-room house, Westinghouse states. This amount of insulation could be made from a 35 gallon barrel of the liquid resin.

—o—

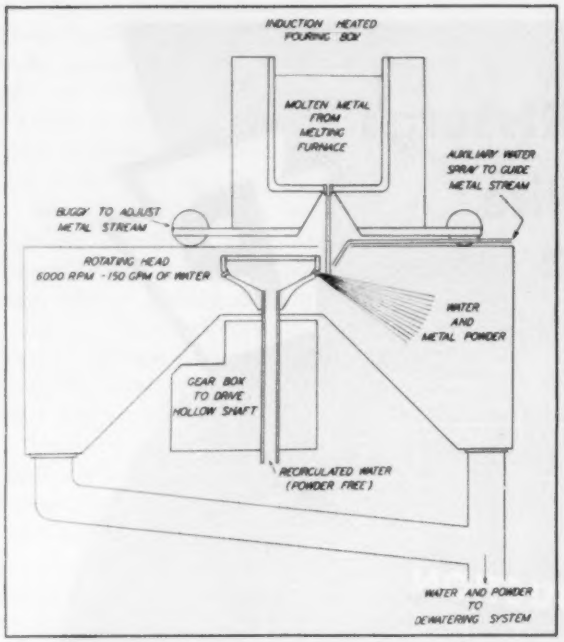
Standard seamless drawn steel tanks for spray painting, galvanized inside and out, are available for prompt delivery in capacities from 2 to 60 gallons, according to Binks Mfg. Co., Chicago. These tanks meet American Society for Metallurgical Engineers specifications and handle working pressures to 110 pounds. They are available with manual or motor-driven agitators and top or bottom outlet.



Production goes up—costs come down when you use Pittsburgh Carbon and Alloy Steel Wire in your manufacturing operations. It has the uniformity and accuracy to work easily in your machines—produce better wire products for you.

High Strength Parts Made from

PREALLOYED STEEL POWDERS


INDUCTION HEATED POURING BOX
MOLTEN METAL FROM MELTING FURNACE
AUXILIARY WATER SPRAY TO GUIDE METAL STREAM
BUGGY TO ADJUST METAL STREAM
ROTATING HEAD 6000 RPM - 150 GPM OF WATER
WATER AND METAL POWDER
GEAR BOX TO DRIVE HOLLOW SHAFT
RECIRCULATED WATER (POWDER FREE)
WATER AND POWDER TO DEWATERING SYSTEM

Prealloyed steel powders are manufactured in a process shown in this drawing. Tundish or pouring box at top of apparatus receives the molten metal from the melting furnace

COMPLETE series of prealloyed steel powders that can subsequently be heat treated to high hardness and strength levels are being made by Vanadium-Alloys Steel Co., Latrobe, Pa. The company recently obtained the rights to the F. W. Berk & Co. Inc. process—a method currently used to make nonferrous powders—for producing the prealloyed ferrous powders.

Initial plant production unit capable of an output of about 20 tons per week is now ready for operation, the company reports. Stainless steels of all types, SAE 1000 steels and high alloyed materials for high temperature engineering applications have already been produced.

Disintegration of a small molten metal stream by water jets is the process used in the manufacture of prealloyed powdered steel. Steel of any composition is melted in a standard 1000-pound electric melting unit, then transferred to zirconium silicate refractory-lined 150-pound tundish which is electrically heated to control and maintain molten metal temperature. Placed in the bottom of the tundish furnace is a ⅛ to 3/16-inch diameter zirconia nozzle from which the 2800 to 3000° F molten metal falls into the disintegrating machine.

Determining Size — Size of the powders produced is determined by rate of flow, temperature and composition of metal. It is stated that coarser powders can be used for shot and grit applications. Metal stream is guided into the disintegrating flow of water at an angle by an auxiliary water spray. Disintegrating flow is forced through nozzles in a rotating disk, centrifugal action of which builds up the pressure. Sixteen nozzles in the outer periphery of the hollow disk (which rotates at 6000 rpm) blast the pencil-thin stream of metal into powder.

Dewatering system consisting of a Deister classifier, Allen slime cone and a Vortrap receives the water and powder mixture. The cone collects the major part of the powder, while the Vortrap collects the extremely fine powder. Undesired coarse particles may be separated in the classifier and discarded, it is reported. Moisture in the amount of 10 to 15 per cent is contained in the product of the slime cone and Vortrap. An Oliver rotating filter reduces this figure to about 3 to 5 per cent.

Furnace Drying — Product must then be dried in a gas fired furnace at 400 to 500° F for 30 to 60 minutes, following which it is reduced and annealed in a continuous pusher type hearth furnace employing an endothermic, partially combusted gas atmosphere. The small amount of oxide on the surface of the particles is reduced in the first zone which operates at approximately 1900° F. The second zone operates at a temperature below the transformation temperature of the steel for isothermal annealing to produce a low particle hardness. The furnace cycle is 4 to 5 hours. After the annealing operation the powder is placed in a water-cooled jacket and later screened on a Selectro vibrating screen to the desired mesh size. Powders are being offered in −20, −50, −80 and −100 mesh sizes.

It is stated that the powder has a spherical form which aids in attaining a high rate of flow through feeding nozzles on automatic pressing machines. High apparent density and lower compression ratio are also claimed. Alternate processes for achieving the near 100 per cent density said to be possible are: Cold pressing, sintering and hot coining; and hot pressing and sintering.

Tests made by Vanadium-Alloys with SAE 1095 steel powder of −50 mesh, hot pressed at 2375° F for 5 minutes indicated that it has 100 per cent density. After air cooling, it had an annealed hardness of 83 Rockwell B; after water quenching from 1550° F, it had an as quenched hardness of about 60 Rockwell C. Subsequent tempering at 805° F brought its hardness to 34 to 39 Rockwell C. Tests for tensile strength of bars made from this piece are said to have ranged from 159,000 to 180,000 psi.

TABLE I
TYPICAL SIZE DISTRIBUTION OF SEVERAL POWDERS

Size	SAE 1015 −100 Mesh	SAE 1095 −50 Mesh	18-8 Stainless −20 Mesh	SAE 4620 −80 Mesh
−20 50	...	< 3%	13%	...
−50 80	...	17	23	< 2%
−80 100	< 1%	13		12
−100 140	21	14.5	25	18
−140 200	22.5	15.5		19
−200 325	25	17	17	26
−325	30.5	21	22	23

TABLE II
TENSILE STRENGTHS OF CERTAIN PREALLOYED STEEL POWDERS, −100 MESH. COLD PRESSED IN LUBRICATED DIE

Pressing Pressure (Tons per square inch)	Tensile Strength (Pounds per Square Inch) SAE-1095*	SAE-1015†
30	33,000	20,000
40	47,000	24,000
50	62,000	30,000

* After sintering for 2 hours at 2000° F, air cool and not heat treated.

† After sintering for 1 hour at 2100° F, air cooled and not heat treated.

Note: Heat treatment would improve tensile strengths.

FUNDAMENTALS of STEELMAKING

NUMBER 7 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Production of Metallurgical Coke AND RESULTANT COAL CHEMICALS

By Philip S. Savage
Vice President
Donner-Hanna Coke Corp.
Buffalo

The coke oven industry has now reached a point where it is more vital to cut costs than to make immediate further improvements. Standardized ovens are now practical and operators can save money if they will minimize engineering by using standard equipment wherever possible

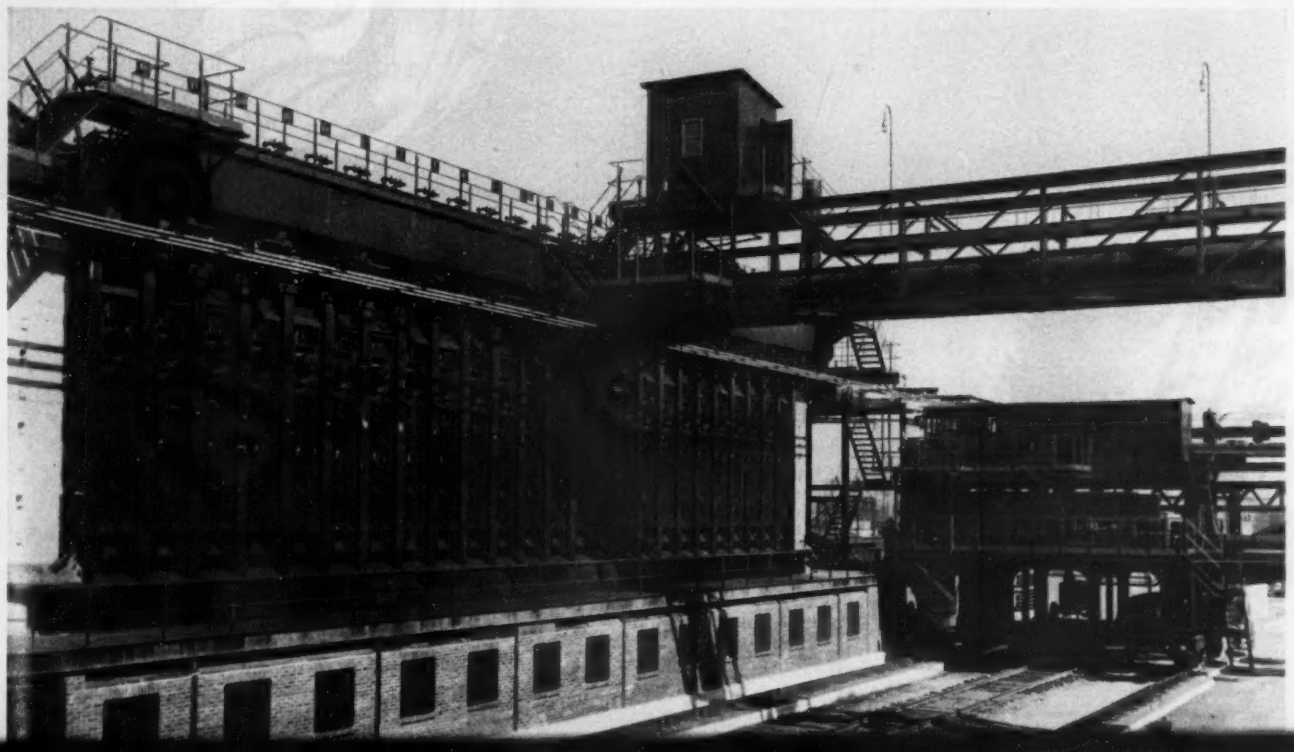
PART II

THE heart of any coke plant is the ovens. They represent by far the greatest part of the capital outlay of a coke plant, and coke produced directly from them represents approximately 75 per cent of plant income. In the ovens, not only is coal changed to coke, but the coal's volatile elements are cracked and reformed by the heat and very possibly by catalytic action of the hot silica and carbon into chemical products that are finally recovered. Cost of producing the chemical products of coal starts in the ovens, and these chemical products should carry a fair share of oven and coal costs, as well as the cost of their recovery. The "by-product" type of accounting is one reason why a fair return has not been realized from these products.

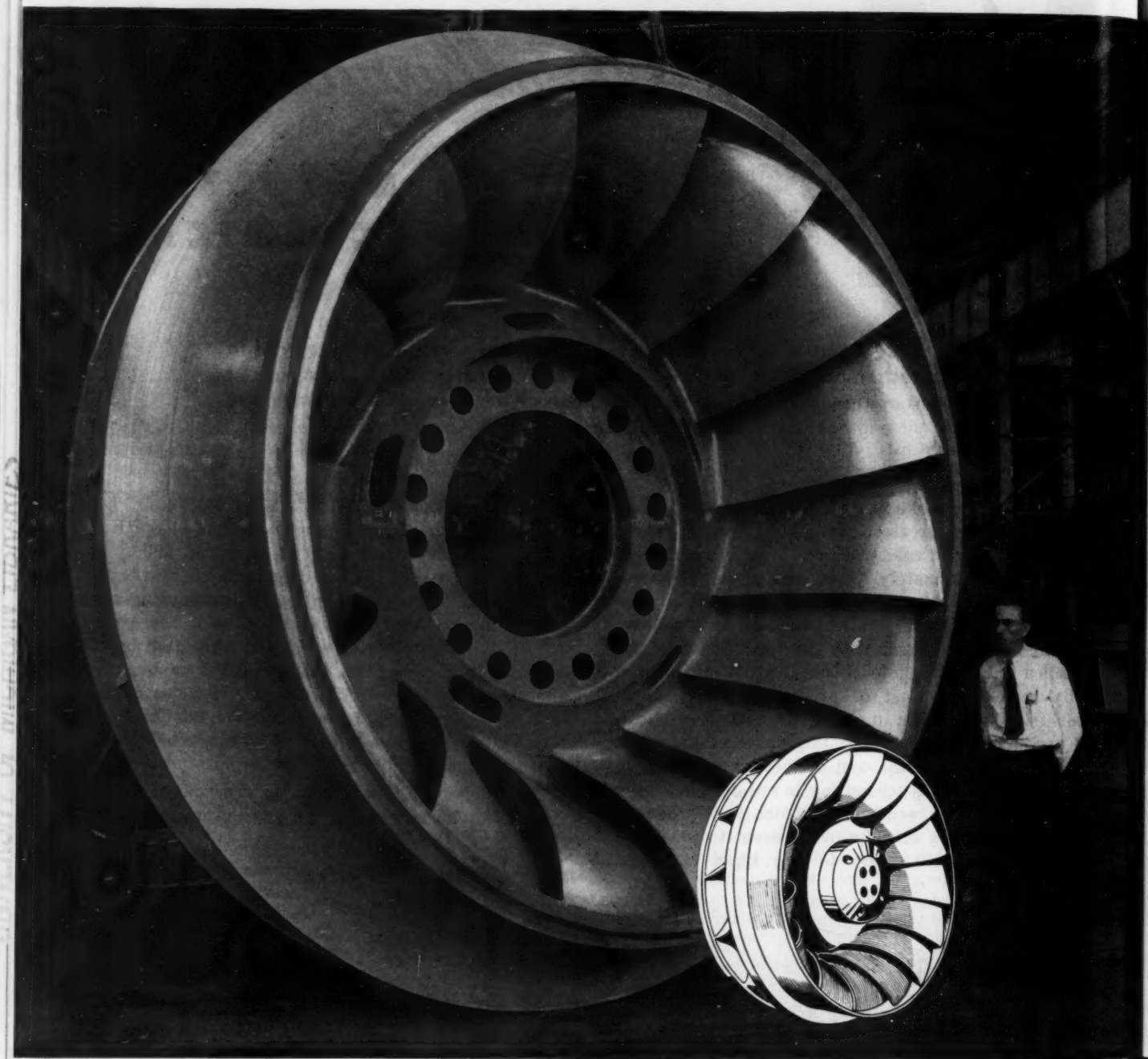
American buyers of coke ovens seem to have settled down in recent years to two types of ovens, namely the Wilputte and the Koppers-Becker, both vertically flued. These are developments of the Heinrich Koppers ovens brought to Joliet in 1908. Although their ruggedness is demonstrated by the fact that there are many installations still producing coke, the horizontal flued Semet-Solvay oven has passed out of the picture as far as new construction is concerned. In Europe, too, the vertical flued oven has almost supplanted all other types. However, in Europe the hairpin type flue construction, which has not been built in America to date, is widely used and produced in Europe by Otto, Koppers and others.

The original Koppers oven is descriptively called the half-divided oven, as the gas burns up half the

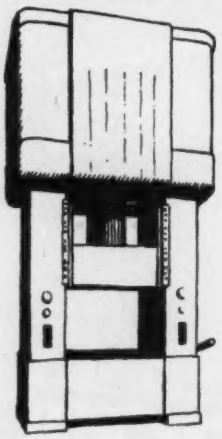
Fig. 9—Modern battery of American underjet ovens



few limits on size - - -



Standard has produced some of the largest turbine runners ever installed, for some of the nation's greatest hydro-electric developments.

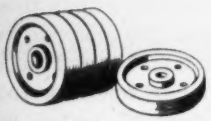


Massive parts for mammoth presses, where loads run into hundreds of tons and the soundest, strongest castings are essential, are regularly produced at Standard.

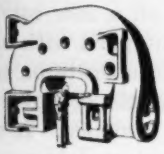
no limit on know-how

Successfully producing such intricate castings as the turbine runners illustrated calls for specialized skills, experience and facilities—and you'll find them all waiting to serve you at Standard: expert pattern making, that is equal to the most involved jobs . . . steel production in Standard's own open hearth furnaces, that permits exact control of the selected metal composition . . . modern molding practice . . . ample crane capacity and floor area to handle the largest jobs . . . heat treating facilities that can produce substantial improvement in desired physical properties. Large or small, every Standard casting reflects the know-how gained in over a century and a half of metal working experience.

STANDARDIZE ON STANDARD FOR



WHEEL MILL PRODUCTS



STEEL CASTINGS

WELDLESS RINGS

FORGINGS

ATTENTION: DESIGN AND PURCHASING DEPARTMENTS

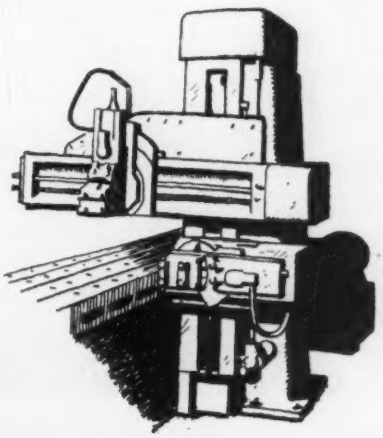
Standard is equipped to produce castings ranging in weight from 5 to 130,000 pounds for all classes of service. Recent developments in chemical compositions and heat treatments produce substantial improvement in physical properties. Whatever your needs—let Standard quote on your requirements.

The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U.S.A. Offices: Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington.

BALDWIN

STANDARD STEEL WORKS DIVISION

Castings for bridge supports, and similar miscellaneous castings for structural or other uses, can be produced in any size and quantity in Standard's modern foundry.



Frames, bed plates and similar members for precision machine tools often demand special properties and unusual quality in the castings. Standard specializes on such production.

flues on one side and down half the flues on the other, periodically reversing. The Wilputte oven can be called a four-divided oven. It is in reality two half-divided ovens built end to end, gas burning up two quarter sections of each oven and down the other two quarter sections, reversing as in a half-divided oven. The Koppers-Becker might be called a fully divided oven as gas burns up all flues, over the top of the oven and crossover flues and down the flues the full length of the adjacent wall, reversing from wall to wall rather than from section to section. The hairpin flued oven is divided between each flue, gas burning up one flue and down the next, reversing through alternate regenerators.

The half-divided oven as built by Koppers, both in America and Europe, during and shortly after World War I was by far the most popular oven at the end of the war period. Its popularity was rightfully earned by its ease of control and ruggedness of its construction. Many ovens of this type are still running economically today after more than 25 years of service. However, the demand for larger ovens that could be heated with low Btu gases such as blast furnace and producer gas made it seem necessary to oven designers, both here and on the continuent, to allow freer gas flow through the flue system without making such large gas passages as would weaken the oven structure. Expiration of basic patents on the cross-regenerative oven coincided with this need, and as a result the successful ovens described above, and others not so successful, were designed and built in "the middle twenties."

Joseph Becker of the American Koppers Co. developed the Koppers-Becker oven so widely used in this country. Louis Wilputte adopted many of the best features of European ovens to his own American design, bringing the first high and low burner oven and underjet oven to this country. In Europe, Dr. Carl Otto developed a hairpin flued oven with the underjet principle, and other European designers followed his general design. All builders of ovens greatly improved auxiliary oven equipment. The self-sealing door has now become almost standard for new oven construction.

During this period of flux from the small rugged oven of "the early twenties" to the much larger more nearly automatic oven of "the forties," many serious mistakes were made, but I think all coke oven operators will today agree that any of the leading types as now built will combine high capacity and minimum labor with every expectation of long life. Short life of many of the large ovens built in "the twenties" was due much more to the fact that they were built too narrow and with too little taper than to any fault in their fundamental design. Except for very special coals, such as those found in Utah, I do not believe that any coke oven builder or operator today would build a large oven less than 17 inches wide and with less than a 3-inch taper. The average oven built today is 17 to 18 inches wide, 12 to 13 feet high, with a 3 to 4-inch taper. If built on a new site, it will probably be an underjet type, equipped with self-sealing doors. It will be designed to operate on a 1-inch per hour coking time, but capable of substantially exceeding this if the occasion demands. It will usually be designed to heat with blast furnace or producer gas, if not immediately, at some future time.

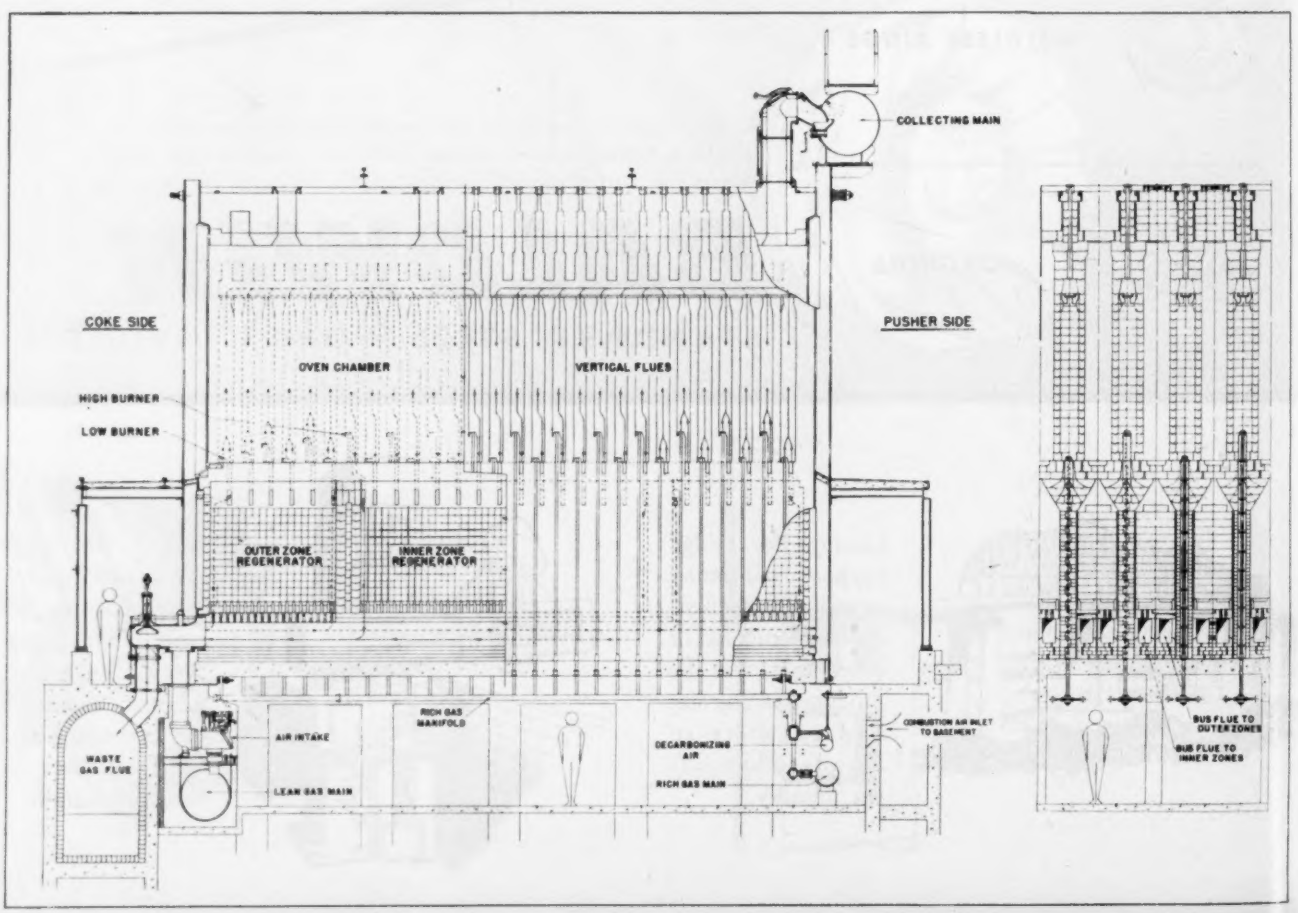


Fig. 10—Wilputte underjet coke oven

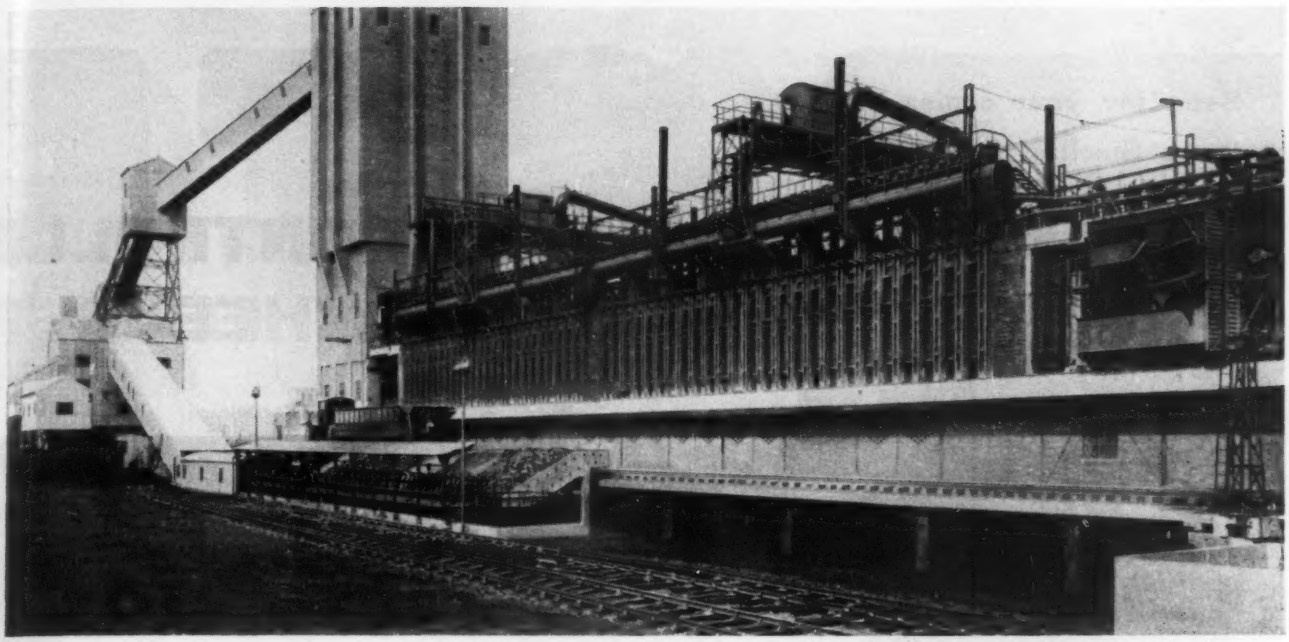


Fig. 11—View of modern European coke ovens, underjet type

By either the use of high and low burners or the recirculation principle, it may be heated uniformly from top to bottom and in the ends with either high or low Btu gases. It will be so designed that excessively hot tops will not destroy valuable chemical products and produce excessive carbon.

Such an oven as described can be built from designs and drawings now available. The coke oven industry has now reached a point where it is more vital to cut costs than to make further immediate improvements. Standardized ovens are now practical, and I think buyers of coke ovens would save a great deal of money if they would minimize the engineering by using standard equipment wherever possible. There may come a day when some radical design will revolutionize the industry, but there has been no sign of it in the past 30 years. All real improvements have come very gradually, and ovens built 30 years ago are not obsolete today if they have been well maintained.

While the oven is the heart of any coke plant, the coal it receives is its life blood, and much too little thought and money has been spent on proper preparation of coal for use in the coke oven. Proper and adequate coal blending equipment can enormously increase the suitable coal reserves of this country, and a few thousand dollars extra spent on special blending equipment can pay for itself many times a year in cheaper coal bills, longer oven life and better operation in blast furnace or foundry.

The average coke plant of the past has been built with from two to four mixing bins. Many plants

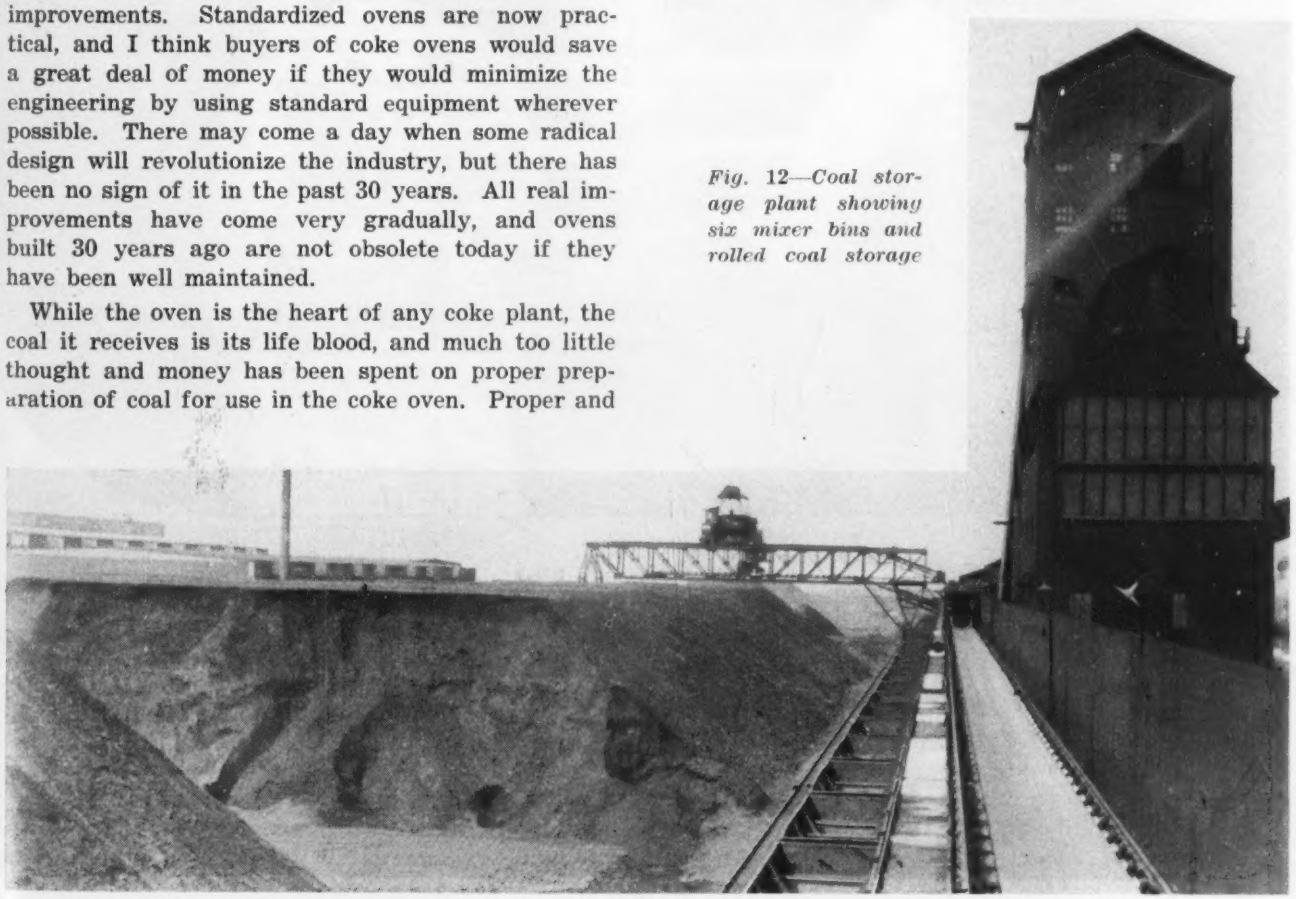
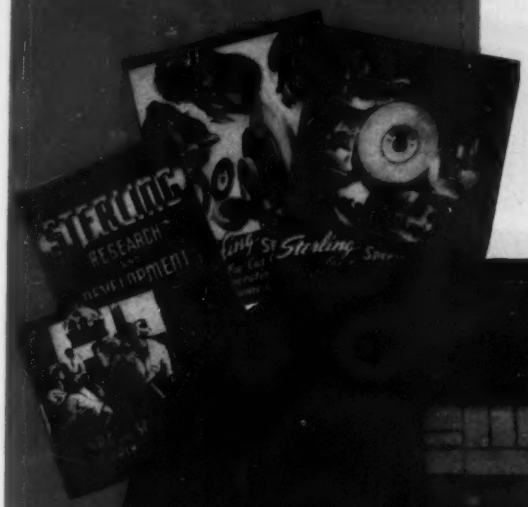


Fig. 12—Coal storage plant showing six mixer bins and rolled coal storage

Send for your copies of these Sterling folders.



STE

WHERE CONTROLLED
YOUR WHEELS TO

At regular intervals, Sterling's pressed wheels and segments enter continuous operation kilns for heat treatment. Here, under carefully controlled degrees of high temperatures, bond and grain are fused into grinding wheels whose superior performance is assured by this and other strict adherence to high standards of Sterling's Research and Development Program.

"THE WHEELS OF INDUSTRY"
STERLING
GRINDING WHEELS

ERLING

LEAT TREATMENT ANNEALS TORE-DETERMINED STANDARDS

UNUSUAL concern with ordinary procedures, as evidenced by our carefully regulated and controlled heat treatment, is but a part of the many desirable features of Sterling's New Research and Development Program.

Backed by years of planning, this new idea of cooperative effort between manufacturer and customer is now offering quicker, positive solution of your grinding problems. This is accomplished by Sterling's "Wheels of Industry" being especially designed for the job to be done. Tested formulas, built to the recommendation of your Sterling engineer and approval of Sterling's grinding technicians, now positively eliminate guesswork on any problems related to cutting, roughing, finishing, polishing, etc.

May we show you how Sterling Grinding Wheels, tailor-made to your needs, will do your jobs faster and more economically ?

STERLING RESEARCH AND DEVELOPMENT IN ACTION

FIRST STEP The part being ground shows excessive wear and poor finish. The Sterling engineer arrives to apply his "know-how."

SECOND STEP Skilled by years of experience, he studies both the wheel and machine to discover the hidden fault.

THIRD STEP He now replaces a worn machine-part that was causing the trouble. No need to replace wheel.

FOURTH STEP Machine and wheel will continue to work faster . . . better, thanks to the Sterling engineer's aid.

THE STERLING GRINDING WHEEL DIVISION

of

THE CLEVELAND QUARRIES CO.

TIFFIN, OHIO

Since 1885, Manufacturers of "The Wheels of Industry"

Branches: Boston, Chicago, Cleveland, Detroit, Los Angeles, Philadelphia, New York. Distributors In All Cities.

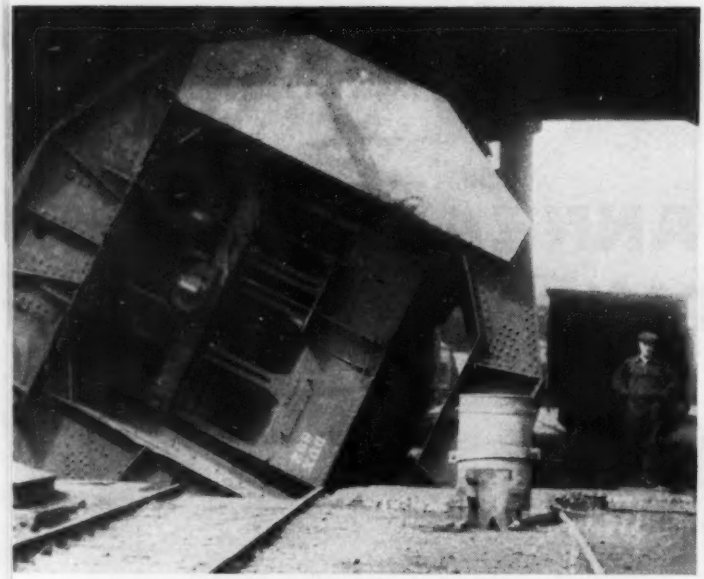
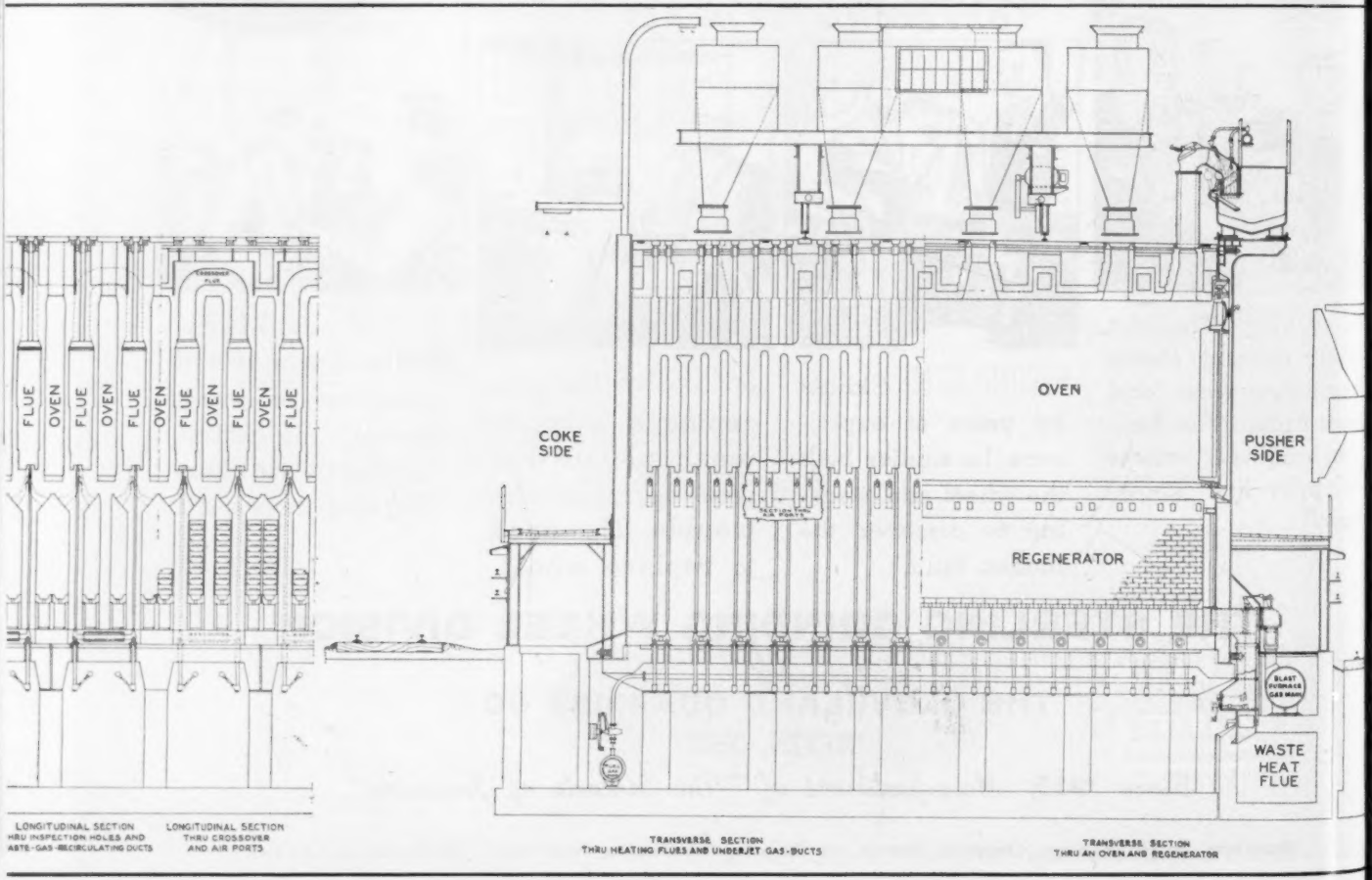


Fig. 13—Rotary car dumper shown in operation

simply blend low and high volatile coal. With the coal situation as it has been for some years, and is sure to be in the future, no plant of any size should be built with less than 6 mixing bins, and as many as 8 can often be worthwhile. We have for several years been blending three types of low volatile coals, namely—Pocahontas No. 3, Pennsylvania low volatile (mostly strip coal) and anthrafines. The other three mixer bins available are used for two broad types of high volatile coal, with one bin reserved for miscellaneous strip coals, many of which have been almost noncoking. As much as 34 per cent of anthrafines and coal of questionable coking quality has been blended into the mix. By making up the balance of the mix with strongly coking coals, a coke has been produced equal or superior to most blast furnace cokes made from standard coking coals. Even better than multiple mixing bins might be an adequate bedding system where blending could be carried out in almost infinite variations. Use of substandard coals has had two beneficial effects; first, considerable saving has been made in cost of coal going to the ovens and, second, coal has been available during strike periods at times when standard coals could not be obtained in sufficient volumes to keep up maximum production.

For many years coke oven operators have observed that improved coke and resultant improved furnace practice sometimes occurred when heated coal from an old stock pile went into the mix. In our blending of strip coals we have found that some weathered strip coals which were practically noncoking gave us the effect of a substantial increase in low volatile coal. We have also definitely proved after many years of use that a small percentage of anthrafines of proper fineness can replace at least its equivalent of the best No. 3 Pocahontas, with no bad results at the blast furnace. Experimentally we have made coke with 20 per cent Pocahontas outcrop coal, or bloom, that had absolutely no coking qualities, blend-

Fig. 14—Koppers-Becker underjet low differential combination coke oven with waste gas recirculation



ed with 80 per cent standard high volatile coking coal, and the resulting coke appeared to be in every way equal to the same blend using fresh Pocahontas coal. The beneficial effect of low volatile coal is entirely due to its effect on the plastic mass. If there is enough agglutinating material in the coal mix, the noncoking inerts may under certain conditions fully perform the functions of low volatile coal. If this supposition is true, many noncoking coals may be used in future coal mixes either with or without pretreatment and the reserves of coking coal will be greatly extended.

Mixer bins, or coal bedding equipment, are only the first step in blending. Coal must be pulverized to a fineness sufficient to prevent undue segregation. Most practical method of thoroughly mixing is to pulverize the coal in hammermills, after the mixing bins. While the coal crusher, protected with magnetic pulleys, can be substituted for Bradford breaker equipment before the mixing bins, Bradford breaker equipment is still the most desirable, and nothing developed to date can take the place of a hammermill for economically pulverizing coal for coke oven use.

Equipment for treating mixed coal with oil is very desirable. The application of small quantities of oil to the mixed coal nullifies to a large extent variations in weight per cubic foot caused by change in moisture in the mixed coal. This makes a more uniform coke. Other advantages from the use of oil are slightly increased gas and coal chemical yields, faster charging, and ability to get maximum charges of coal in the oven. The user of oil must take into account the swelling character of the coal and the condition of his ovens. Increase in maximum density of the coal charge will increase swelling characteristics of a given mix. However, use of oil is another tool in the operator's hands, and equipment to use it in the coal mix is highly recommended. Some operators producing gas for city use have used as high as 4 gallons of oil per ton of coal, and appreciably increased their gas make. However, this amount of oil cannot be used unless there is reserve heat in the ovens. For volume control and fast charging, only 2/10 to 7/10 of a gallon of oil per ton of coal is used. Oil usually used is No. 5 fuel oil heated to approximately 100°F and sprayed on the coal at the hammermill inlet. Meters and automatic shutoffs must be provided.

After coal is pulverized and thoroughly mixed it must not be allowed to unduly segregate. Oven coal storage bins should be provided with distribution chutes and partitions that will not allow serious segregation of well pulverized coal. It sounds radical, but I believe that modern conveyor equipment is so reliable that money invested in more and larger mixer bins would be much more valuable than in oven storage bins. A storage bin holding only a few larry cars of coal fed from large and adequate mixing bins would not alone insure a better mixture, but would almost eliminate bin segregation, and with properly designed larry cars would put mixed coal in the ovens in much better condition than would equipment ordinarily available.

Coal unloading and storage are expensive, but a necessary adjunct to any coke plant. Storage of a 30 day supply of coal is normally considered a minimum. In a large plant receiving rail coal, a rotating car dumper and a coal bridge are in a class by themselves for unloading and storing coal at low cost. However, their high capital cost may not be justified in a small plant. Development of the Robins car shakeout makes possible fast and economical unloading, with very little capital expenditure. Use of caterpillar type tractors, bulldozers and carry-alls will store and recover large volumes of coal quite cheaply where the capital expense of a coal bridge is prohibitive. Spreading and compacting of coal with tractors and bulldozers, whether stocked with a bridge or otherwise, is a necessity where long storage is anticipated. The added storage space made

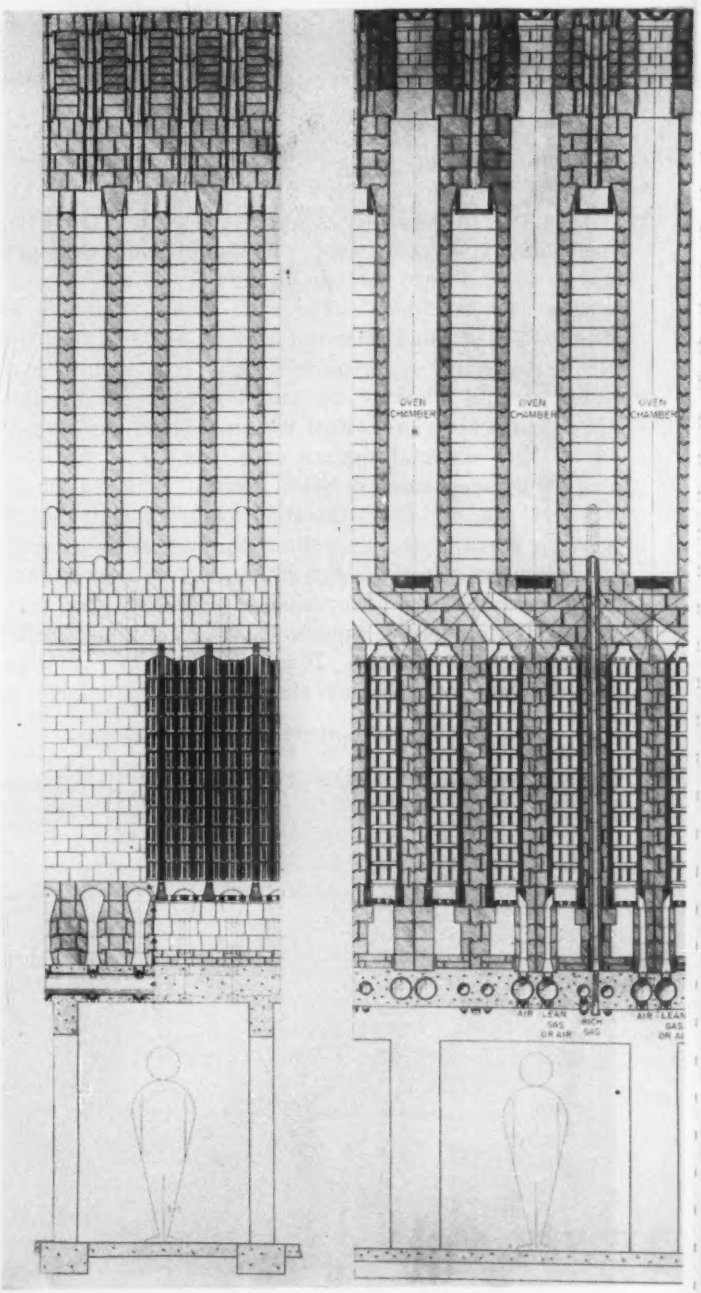


Fig. 15—Otto hairpin flue-high, low burner oven

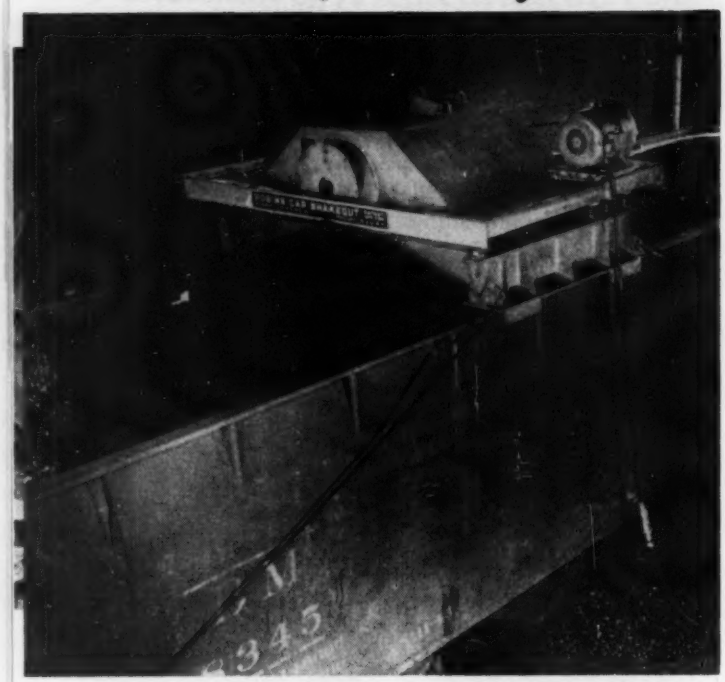


Fig. 16—Car shakeout shown in operation

available by the compacting will often more than pay for extra work required.

Handling of coke begins when it is pushed from the ovens into quenching cars. It should leave the coke guide and fall into the car in such a way that breakage is at a minimum. The coke guide should be so designed that coke does not fall on the tracks after the quenching car is moved away. Quenching car doors should likewise be built to prevent spillage. Development of hard steel wearing plate has tended to let this material replace cast iron. Electric door operating mechanisms have largely replaced pneumatic types, and stainless steel bushings and pins in moving parts of the quenching car will tremendously cut maintenance at points where corrosion combined with wear make deterioration of ordinary steel very rapid. Brick paved wharfs have largely supplanted cast iron wharf plates. It is important to so design the delivery of coke on the belt that breakage is minimized and belt scuffing prevented. Synthetic rubber belts carrying freshly quenched coke, often very hot, from wharf to the screens, have proved actually better than the best rubber belts made prior to the war. In fact, belts that in 1930 would carry less than a million tons before discarding, are now carrying over twice as much with ease. Better belt design, as well as more suitable rubber wearing surface, has made this possible.

Optimum size of blast furnace coke is somewhat controversial, however, most operators will agree the size should be as uniform as practical. Best blast furnace operations can be obtained from a given coke if it is top crushed to approximately 4½ inches, and then screened into at least two sizes of blast furnace coke. These sizes for best results must be charged separately at the furnace. With this type of screening it is possible to use all coke in the blast furnace down to ¾-inch, and under some conditions to ½-inch. Top screening of coke is usually done with a disk grizzly, oversize being delivered to an adjustable crusher. Modern high speed shaking screens have largely replaced grizzlies in sizes below 3 inches. Means should be provided to load cars with a minimum of breakage, and to prevent spillage when dumping cars.

In order to prevent dangerous and corrosive steam from the quenching station blowing back on the ovens and oven equipment, most new plants have extended their quenching hoods to a height of from 80 to 120 feet.

One must remember that coal chemicals are made in coke ovens and basic chemicals are only recovered and refined in coke plant chemical departments. All chemical products of coal come off the oven as gases or vapors. Recovery of these products commences just as soon as the gas leaves the oven gooseneck where hot gases are hit with a spray of flushing liquor. Coke plants of World War I, and shortly after, used a mixture of tar and ammonia liquor for flushing. When flushing liquor was too thin, pieces of pitch cut off the mains by the "tar chasers", as this very unpleasant occupation was called, would not flush out of the mains and often caused stoppage.

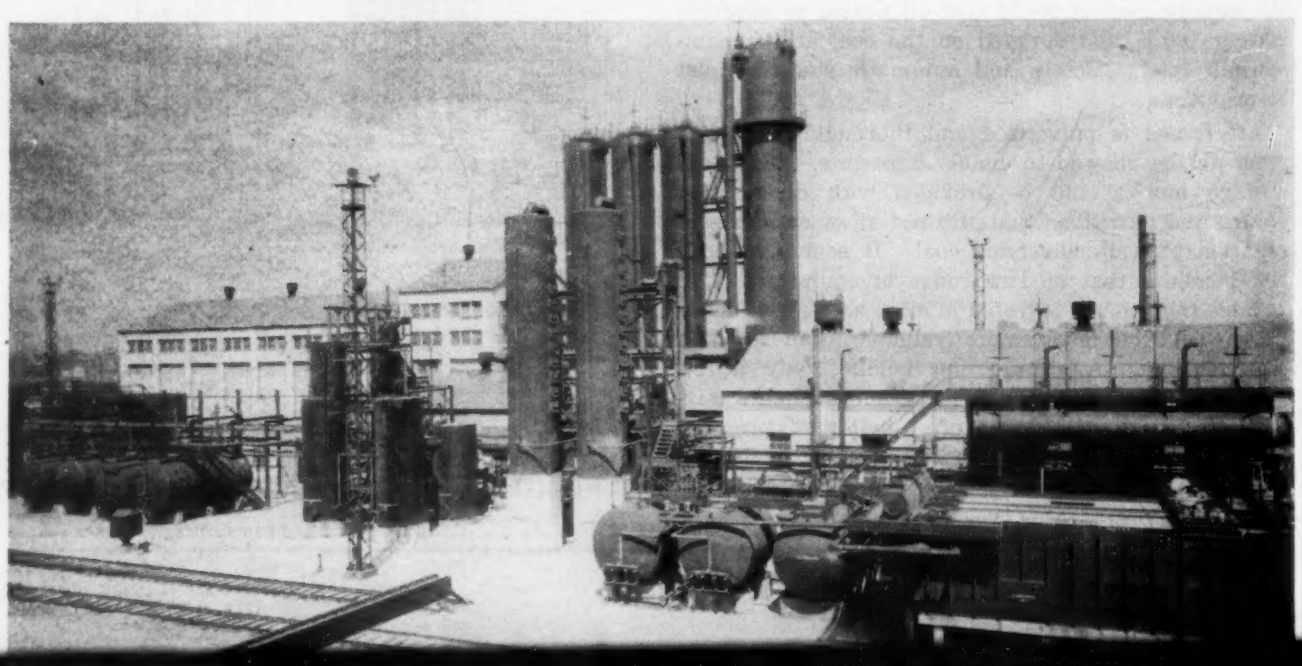


Fig. 17—Typical coal chemical recovery plant

"King Size" Power-Shovel Bucket made of J&L HEAT-TREATED JALLOY STEEL still going strong after full year's gruelling service!

J&L STEEL

Performance record on this Marion No. 5561 power shovel proves high-impact and abrasion resistance of J&L heat-treated JALLOY
BIG SCOOP!

—40 CUBIC YARDS

of earth and rock in one "scoopful." This monstrous power-shovel bucket excavates 10 acres to a depth of 50 feet *in a month.*

Working *day and night* it removes overburden on a large strip mining operation in southern Illinois. As it digs its way through some 15 feet of limestone, 15 feet of shale and 20 feet of clay, it is subjected *continuously* to severe abrasion and impact.

Yet the J&L *heat-treated* JALLOY STEEL on the bucket *has given more than a year of service!*

To date more than 6,000,000 cu. yds. have been excavated, but the excellent appearance of the J&L heat-treated JALLOY STEEL indicates a reasonable expectancy of *many more* months of service before replacement is necessary.

J&L *heat-treated* JALLOY STEEL was developed for just such uses as this—where steel must withstand extreme abrasion and heavy shock for long periods of time. Its outstanding wear-resistant properties make it especially useful for Scrapers . . . Rock crushers . . . Bulldozers . . . Truck bodies . . . Dump cars . . . Chutes . . . Power-shovel buckets.

Wherever wear and abrasion are limiting factors in the life of equipment, you'll find it profitable to use J&L *heat-treated* JALLOY STEEL. May we send you the booklet mentioned in the coupon?

Jones & Laughlin Steel Corporation
404 Jones & Laughlin Building
Pittsburgh 30, Pa.

☐ Please send me your booklet: "JALLOY—J&L ALLOY STEEL."

☐ Do you recommend Jalloy for:

_____

NAME _____

COMPANY _____

ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Production of Metallurgical Coke

Fortunately for coke oven operators it was soon discovered that clean ammonia liquor sprayed into the hot gas before it entered the mains could reduce the gas temperature below the pitch-forming point and prevent any formation of pitch in the mains. Recommended practice calls for 1500 to 2000 gallons of flushing liquor per ton of coal carbonized. It is important that non-clogging sprays be used even if necessary to sacrifice the greater efficiency of fine sprays. Coke oven designers have developed several rather ingenious dampers between ovens and mains to allow for continuous spraying without danger of the spray running back into the oven and spalling its walls.

Heavier tar and some water vapor and ammonia are condensed in the collector and suction mains. These products of condensation add to the flushing liquor and are drained off to a separating tank. Modern separators are designed relatively long and shallow in distinct contrast to the high separating tanks used in earlier plants. Most separators incorporate automatic cleaning devices such as sludge draw-offs from bottom of hoppers, or continuous scraper conveyors which continuously clean out fine particles of coal and pitch that settle out in the separating tank. Tar from the separator is decanted to a tar receiver tank which is equipped with steam coils of sufficient area to heat the tar to the boiling point of water. If enough steam coils are provided, this tank may become an actual dehydrator removing practically all water and distilling off some of the carbolic oil and naphthalene. Tar receivers and tanks should always be designed with sufficiently large openings to assure reasonably easy cleaning of the tank. Steam coils should also be so placed that the tank bottom is not obstructed. Cleaning of tar equipment is one of the most disagreeable jobs around a coke plant. The most practical means for cleaning tar tanks is a long hoe attachment carried by a bucket mechanism on a tractor. It can be lifted and inserted into the manhole half way across the tank. The hoe is then dropped and, as the tractor backs out, a wheelbarrow placed outside the manhole is loaded with each move. With this device and properly placed steam coils, a tar tank can be effectively cleaned without anyone entering the tank and with a minimum of labor and mess.

Surplus ammonia liquor is pumped to storage from the separating tank, and the balance returned by pumps to the flushing sprays. Some plants have found it necessary to install centrifugal continuous tar dehydrators in order to remove sludge and excess moisture from their tar. Likewise, some plants find it necessary to filter their weak ammonia liquor before delivery to their ammonia still. Excellent equipment has been designed by specialty manufacturers to do this work when it is needed.

(To be continued)

Maintenance Parts

(Continued from Page 104)

In other instances, when the number of machines available affords a wide degree of flexibility in scheduling production loads in the event a breakdown occurs, the need for complete units for replacement purposes is negligible since it is generally practical to reschedule the load from a machine temporarily out of service due to failure among the others in operation and to do this without incurring a serious work stoppage or severely overtaxing capacity of the remaining units.

Although it is impossible to give specific quantitative ratios of stocking repair parts for replacement to equipment units in service because operating conditions and related factors vary so widely among different plants, some general reflections can be made. These observations, based on accumulated plant experience, have been found to have an important bearing on the need of maintaining a replacement parts supply in most plants.

Corrosion, abrasive dust and high room temperature are, in the order of their destructiveness, the principal atmospheric conditions associated with various plant applications which are most likely to cause the need for an adequate motor parts replacement program. Corrosive fumes on steel-mill pickling lines and in chemical plants may cause premature motor failures or excessive wear and tear. A corrosive atmosphere normally affects standard insulated motors more than class B or high-temperature insulated motors. The abrasive dust problem is paramount, for example, on blast-cleaning equipment, and cement plant equipment.

High room temperature causes a hotter-running motor. For example, motors rated 10 horsepower at 40° C rise above surrounding room temperature. If the motor is operating near annealing ovens, furnaces and similar equipment, the insulation is being used at a higher temperature. Insulation life on standard motors is affected by the actual temperature reached within the motor. Above 90° C, class A insulation life is cut in two for every 10° increase in temperature. Assuming the average life of class A motor windings at 90° C, is 20 years, this means that at 100° C, the average life of windings is 10 years; at 110° C, 5 years, and so on.

With the exception of atmospheric conditions, three applications have the most severe effects on electric motors. Overloading is one, resulting in high motor temperature. Although a motor may be rated 10 horsepower, it will carry considerable overload without any visual indication. Nevertheless, it gets hotter than it should, eventually causing failure of stator coils and rotors in the case of alternating current motors and field coils and armatures on direct-current motors.

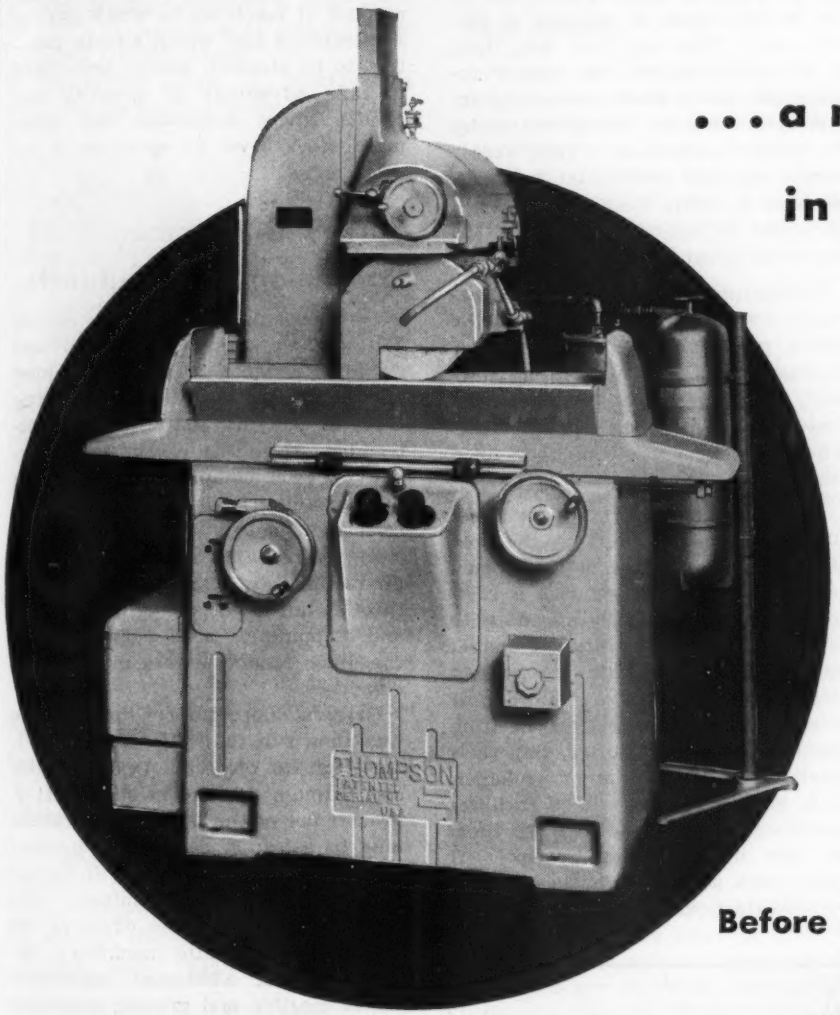
A second major contributor to wear and tear on motors is the equivalent of an overload, caused by excessive starting and stopping. A single start requires a great current inrush; therefore, it produces more heat than when the motor operates normally. Plug reversing and dynamic braking also produce heat.

Third, lack of a regular maintenance schedule based on plant experience. Dirt and wear factors make good maintenance a "must" in every instance. When motors operate under dirty conditions and the units are not cleaned periodically, wear of moving parts increases appreciably. Moreover, accumulated dirt on motor frames and windings prevents proper cooling of coils, causing them to run at above normal temperatures — a condition that, in turn, shortens winding life.

On parts of certain types in frequent need of replacement, the dollar investment is sufficiently small to warrant maintenance of a complete

COOLANT THROUGH WHEEL

GREATLY IMPROVES GRINDING METHODS



. . . a new development in surface grinding by THOMPSON

Now you can grind very thin sections without burning and warpage.

Before You Buy

Investigate

Thompson provides a full range of machine sizes from 6" x 18" to 36" x 240" utilizing the new principle of applying coolant to the grinding wheel. The new Thompson Type "F" Hydraulic Surface Grinder with coolant through the wheel is shown above. All of the coolant is applied through the grinding wheel, making it possible to grind exceedingly thin sections without burning or warping the work.

Very fine finishes are obtained to extremely close dimensions. An outstanding advantage of this patented process is gained in grinding blanking dies and other metal cutting or shearing tools. No amorphus metal is present after grinding. This increases the life of the tool between grinds.

WRITE TODAY **for details of this new process and for information on ways it can save you production time and money! Address Dept. 10, The Thompson Grinder Company, Springfield, Ohio.**

WRITE FOR NEW 32 PAGE CATALOG

Copyright 1949—The Thompson Grinder Company

Thompson SURFACE Grinders

stock. For motors up to approximately 5 horsepower installed in a single important equipment application where only one unit is available, a complete armature and shaft (for direct current motors) or a complete rotor and shaft assembly (for alternating current motors) are suggested for that motor of the particular horsepower, voltage and speed rating involved. A typical stock of recommended spare parts for a direct current motor or generator would comprise this assortment:

1 set—armature coils or one complete wound armature with shaft.
1 set—main field coils.
1 set—intercoils.
1 set—bearings.
3 sets—brushes.

If there are four or five duplicate motors of the same manufacture in service, one complete assortment of the foregoing elements is suggested for stocking. Where interchangeable motors are used on critical machines whose downtime will create a log-jam in the production flow if not speedily restored to service, stocking of complete units for instant replacement of those which fail is advised.

With larger motors, investment in renewal spares mounts up, becoming a sizable expense item in the overall maintenance budget. What type of parts should be stocked? And how many? Again, the answers hinge directly upon the degree of insurance against machine outage desired. It's simply a matter of weighing the cost of parts against the time and money losses sustained by equipment breakdowns.

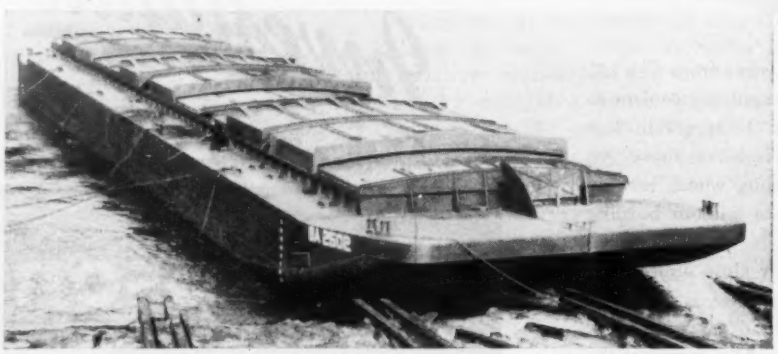
With a complete stock of renewal parts always available to meet all contingencies, rotational replacement by virtue of a continuous maintenance cycle frequently becomes practical. A motor can be removed at regular intervals in relays of, for instance, five at a time, and immediately replaced by cleaned and reconditioned units. The sequence is progressive, providing a circulating unit replacement program that assures having on hand a reserve stock of five motors fit for service at all times.

However, a setup such as this is not practical in many plants due to the limited types or number of motors used. The next best bet, then, is to have available the proper replacement parts when needed. Again, this is a variable dependent wholly on plant experience. This factor varies not only from plant to plant, but also in many instances from application to application within the individual plant.

Protecting motor parts against corrosive deterioration in storage on the user's premises calls for protective packaging by the manufacturer. However, this purpose is frequently defeated in receiving departments where packages are torn open upon receipt to check the packing list.

Large parts not suitable for moisture-proof packaging from the cost standpoint which have machined surfaces should be coated with a rust-preventive solution, wrapped with wax-impregnated waterproof paper and securely tape-sealed to protect them aganist corrosion in storage or shipment. For parts received from manufacturers who do not ship their products in moisture-proof packages, it is good practice to have facilities available at the plant to wrap them in this manner upon receipt. If parts with machined finishes are received which have not been suitably "rustproofed", the user should dip coat them with a quick-drying, non-oxidizing solution prior to stocking.

No discussion of stocking motor renewal parts would be complete without briefly mentioning the importance of proper parts records. Vital guides to sound maintenance practice and specific requirements of the particular plant, such records should show: Supplier's name and address, identification of parts by name and name plate data, location in stock, number of machines to which part is applicable, a fact which affects quantity to be stocked, usage, price data to take advantage of quantity discounts where applicable and minimum stock level to serve as a reorder signal.



AUTO CARRIER: Weathertight rolling hatch covers of this Butcher-Arthur barge can expose 50 per cent of the hatch opening at one time to facilitate unloading of dry cargo. Shown in the Ohio River off the Neville Island yards of its manufacturer, Dravo Corp., Pittsburgh, the barge is designed to carry trucks and autos in the hold and on the hatch covers on downriver trips

Survey Determines Packaging Expo Subjects

Topics for discussion at the annual National Packaging Exposition and Conference on Packaging, Packing and Shipping, to be held in Atlantic City, N. J., May 10 to 13, were determined from the results of a survey of 1400 companies, undertaken by Packaging Division of the American Management Association, New York. Seven major steps to lower production costs and increase sales through improved packaging, packing and shipping of both industrial and consumer products were indicated in responses.

Greatest opportunity for advance was shown in the following areas: 1. Development of techniques to reduce loss through damage in shipment; 2. greater use of the package as a stimulus to sales; 3. design and production of packages which will reduce handling costs by minimizing handling problems; 4. more effective use of present automatic machinery, development of additional machinery where feasible and greater flexibility in production and processing methods and schedules; 5. recognition by shipper of problems of handling and interplant shipment by receiver; 6. fuller utilization of advances in technical development of packaging and packing materials; 7. closer co-ordination of packaging, production and sales for increased production efficiency, increased sales and more economical packaging.

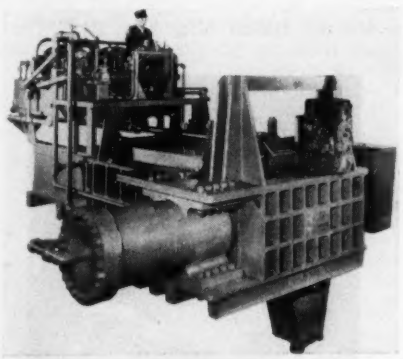
Exposition, expected to be attended by 15,000 suppliers and users, will have 200 companies utilizing 115,000 sq ft of display space. Latest developments and applications of packaging, packing and shipping materials, machinery, equipment, design and services for all types of products will be shown.

New Products and Equipment

Baling Press

High density bales of scrap weighing from 600 to 750 pounds each are produced at the approximate rate of 7.5 tons per hour by the type D, model 600 S-1 Balester, made by Dempster Brothers Inc., Knoxville, Tenn. Machine requires a floor space of 22 x 24 feet. It is 11 feet high and weighs 116,000 pounds.

Operating power is provided by two 75 hp electric motors. Hydraulic

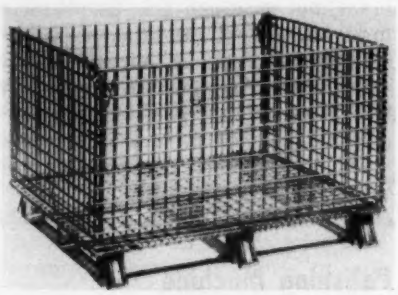


equipment features Vickers pumps and control valves and Meehanite hydraulic cylinders. Charging box measures 35 x 58 x 100 inches and delivers a finished bale measuring 16 x 18 x 35 inches. A skip pan loader of 4⅓ cu yd capacity permits preparation of a charge while the press is baling.

Check No. 1 on Reply Card for more Details

Storage Pallets

Constructed to stand up under the weight of castings, forgings and other heavy parts are Palletainers, made by Union Steel Products Co., Albion, Mich. Light in weight, but



strong, the all-steel storage or handling containers can be loaded and stacked high safely. They interlock in tiers yet allow the use of fork lift or hand lift trucks.

Containers cannot bend, sag or buckle. With sides folded down, space requirements are cut by 75 per cent in the return of empty containers. Standard finish is hot galvanizing or aluminum paint. Containers measure 40 x 48 inches and sides are 24 inches high. Standard model of capacity is 2000 pounds and heavy duty model capacity is 4000 pounds.

Check No. 2 on Reply Card for more Details

Gear Hobber

Speed, feed and indexing can be selected independently on the No. 1 gear hobber built by Hamilton Tool Co., Hanover at Ninth, Hamilton, O. Small spur, spiral, and bevel gears may be machined with a high degree of accuracy on fast production

schedules. Work from 0.050 to 6 inches OD may be handled.

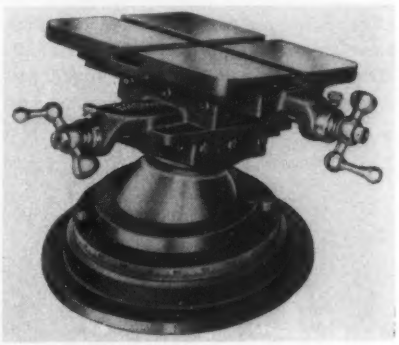
Twelve hob speeds from 109 to 1259 rpm are delivered. Hob spindle turn table swivels 105 degrees to the left and 135 degrees to the right. Helix leads from 0.800 to 130 inches are afforded. Operation is by a ¼ hp motor. Maximum length of feed and of gear tooth are both 5 inches. Maximum diametral pitch is 12.

Check No. 3 on Reply Card for more Details

Milling Table

Made from Meehanite normalized castings, a ball-tilting milling table designed by Leo G. Brown Engineering Co., 1531 S. Sunol Drive, Los Angeles 23, Calif., has a precision ground table top surface. All parts are held to close tolerances and all calibrated dials are hand engraved. Table top is 7½ inches square with ½ x ⅞-inch T-slots for ½-inch bolts. Overall height when level is 6½ inches.

Base index is calibrated for 360 degrees. The crossfeed slide has 6 inches of travel. Lower base of the table is 8¾ inches in diameter. The speed worm gear has adjustments for wear. Adjustable vice jaws to fit any table are offered. Ball will



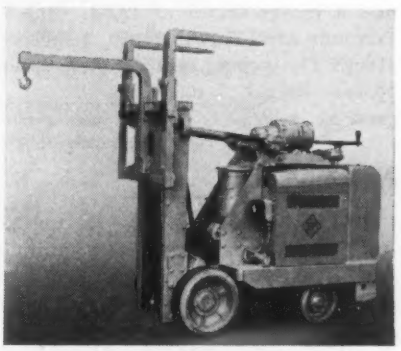
tilt 30 degrees to any angle. The angle adjustment is performed by loosening one of three Allen locking bolts.

Check No. 4 on Reply Card for more Details

Truck Fork Boom Unit

Conversion from fork to boom in a few minutes without use of special tools is possible with the new attachment for trucks built by Elwell-Parker Electric Co., Cleveland, O. Attachment is useful in plants where loads vary in size and shape and are heavy. Both fork and boom can be used together for some jobs requiring extra security in handling.

Device has three main parts: A base member which is attached to the trucks' lifting mechanism and which rides in the upright tilting



columns; fork tines supported from a bar supported on the base; and the boom. Latter is a solid, alloy-steel, heat-treated bar bent at right angles near the middle of its length. When forks are to be used alone the boom is detached by slipping it out of its

holder. Illustrated boom extends 36 inches horizontally from the base. Fork tines are 36 inches long.

Check No. 5 on Reply Card for more Details

Air Presses

Production may be increased on staking, press fit assembling, light stamping, marking and similar successive operations with two new air presses announced by Paragon Metal Products, 844 W. Adams St., Chicago 7, Ill. Features include a guided ram which insures die-like accuracy by maintaining relative position to tools mounted on base, instant ram return for high speed pro-

duction, a 4-inch long side thrust resisting bearing and a base with large ground surface area to facilitate fixture mounting.

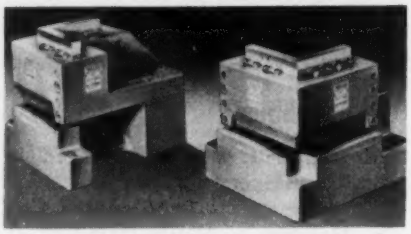
Model AP-1 has a cylinder with a 4-inch bore and a power factor of 12.56 times line pressure. The cylinder of model AP-2 has a 5-inch bore and a power factor of 19.63. Specifications are: Throat depth, 6 inches; stroke 2½ inches; ram, ¾-inch; table to ram height, 7 inches.

Check No. 6 on Reply Card for more Details

Notching Unit

Heavy-duty Wales type NJ notching units which provide a maximum 5 x 5-inch 90-degree corner notch in metal up to ¼-inch thick mild steel are offered by Wales-Strippit Corp., North Tonawanda, N. Y. Units have the same shut height as Wales type CJ hole punching units and may be used in combination setups to punch and notch up to ¼-inch thick mild steel in the same operation. Design permits the same group of notching units to be used again in unlimited setups in stamping presses and press brakes.

Each notching unit is mounted independently and setups may be made quickly according to varying patterns. All parts of the heavy-duty units are built into the self-contained holder. Press ram has only one function—to depress the punch. The



punch is not attached to the press ram. Complete setup, ready to operate, may be made outside the press on T-slotted plates or templates.

Check No. 7 on Reply Card for more Details

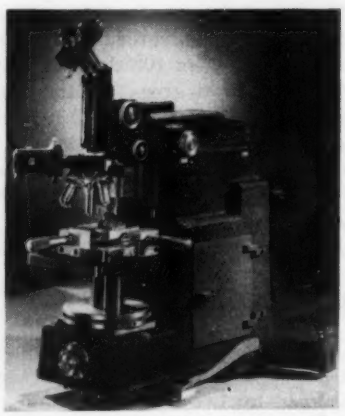
Electric Hoist

Weighing less than 15 pounds, the electric hoist manufactured by Northwest Gear Co., 231 E. Hennepin Ave., Minneapolis 14, Minn., will handle loads up to 500 pounds at the rate of 1 foot lift per second. It can be used on either alternating or direct current and is fully reversible. Its reel drum is fully enclosed. Body of the hoist is of high strength aluminum alloy.

Check No. 8 on Reply Card for more Details

Hardness Tester

Kentron micro hardness tester accurately applies dead weight loads as light as 1 gram, for use with either the Knoop indenter or the Vickers type indenter, according to its manufacturer, Kent Cliff Laboratories,



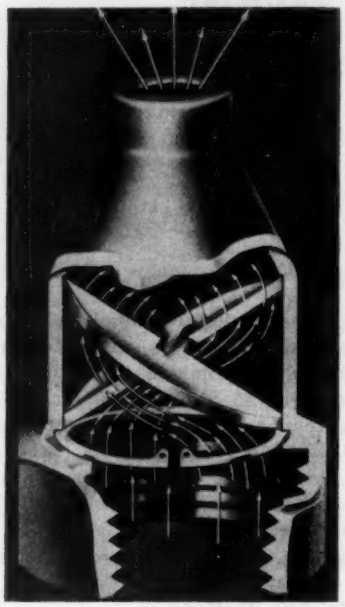
Peekskill, New York. Minute particles, thin metals, transition zones of welds, wire, foil and inclusions may be tested.

Tester is a bench type instrument, hand-operated to eliminate vibration. An adjustable oil dash pot for controlling the speed of load application and time of load retention, is easily adjusted to suit specific testing requirements. A mechanical stage provides a convenient means for locating and positioning the exact area of the test specimen underneath the indenter and miscroscope. Dead weight for applying loads of 1 to 1000 grams and up-to-date optical measuring equipment are supplied.

Check No. 9 on Reply Card for more Details

Spray Nozzles

Manufactured in a range of 17 sizes to fit ¼ to 2½-inch pipe connection, Spra-Rite industrial nozzles, made by Binks Mfg. Co., 3122 Car-



roll Ave., Chicago 12, Ill., are available in small, medium and large sizes. They may be used in chemical plants, for washing blast furnace gases, coal, ore or gravel or other uses.

Standard nozzles are made from brass, but they can also be produced in stainless steel and other corrosion-resistant and special purpose metals which are available as machinable bar stock. The vane type nozzles produce a uniform, full cone mass spray throughout the entire cross section of the spray pattern.

Check No. 10 on Reply Card for more Details

Polishing Machine

Driven by a ¼-hp alternating or direct current motor mounted on its stand, a polishing machine built by Lewis Roe Mfg. Co., 1042 DeKalb Ave., Brooklyn 21, N. Y., is designed for light buffing and coloring work. It is equipped with two self-aligning ball bearing pillow blocks and has a ¾-inch diameter spindle 22 inches

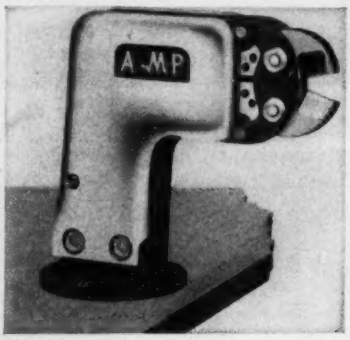
long. Longer spindles can be furnished if required.

Ends of the spindles are turned down to a ½-inch diameter and have eight square threads to the inch. The spindle is tapped for taper points which are furnished with the machine. Also furnished are a switch, 8 feet of cord, a V-belt and a device for keeping belt at uniform tension.

Check No. 11 on Reply Card for more Details

Bench Press

Clean cutting jobs on wire, rod or sheet metal may be performed with the Ampli-Versal foot-operated bench press with cutting head developed by Aircraft-Marine Products Inc., 1597 N. Fourth St., Harrisburg, Pa. Cutting heads can easily be removed and



any one of seven other special heads quickly inserted.

Other available heads perform such operations as indenting, knock-outs, nibbling, U-ing, notching, and installing solderless terminals. Banks heads are also available. Foot-operation allows the operator to guide the work with both hands.

Check No. 12 on Reply Card for more Details

Bend Shaper

South Bend Lathe Works, South Bend, Ind., is announcing a 7-inch bench shaper for toolroom and industrial use. Main castings of the shaper are made of close-grained semisteel. Ram and table slides are milled and hand-scraped and provided with adjustable gibs. Bull gear shaft and countershaft revolve in Oilite bearings. All gears are machine cut from steel or gear fiber.

Shaper ram is 18 inches long and has ample bearing rigidity in all positions. Ram stroke length is adjusted from 0 to 7 inches by shifting the rocker arm shoe until the witness mark corresponds with the desired figure on the rocker arm. Cutting speed is variable from 3 to 114 fpm. Stroke rates of 42, 75, 120 and 195 per minute are obtained by shifting a V-belt on 4-step cone pulleys. The tool head has a 3-inch feed

.It's *yardage* that counts! And my MICHIGAN has convinced me that you don't always need a big dipper to get big yardage. No matter what I put her on—sand, gravel, clay, rock—that baby *really* goes to town! Gets out more yardage per hour than any shovel that size I've ever owned. She crowds and swings fast, and dumps fast and clean. When anyone says truck shovels to *me*, I say, 'my *next* one's a MICHIGAN, too!' For the best 'buy' in a truck shovel, get a MICHIGAN!"

Write for Bulletin 100—
"On the Job With MICHIGAN"

DID YOU KNOW
you can buy
a brand new
MICHIGAN
TRUCK CRANE
complete with
chassis for as
little as $10,250
F.O.B. factory?

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY
392 SECOND STREET, BENTON HARBOR, MICHIGAN, U.S.A.

The Fasteners that add
EXTRAordinary strength to your product
EXTRAordinary speed to its assembly----

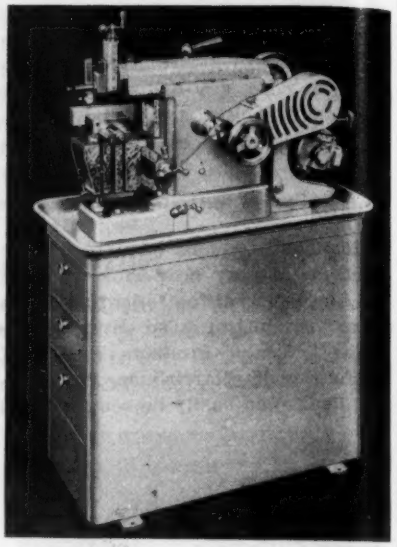
Kaufman Cold-Forging Processed
Cleveland
High Carbon Heat Treated
Cap Screws

• The extra toughness of Cleveland High Carbon Heat Treated Cap Screws adds greater safety to your product; extra precision forming speeds assembly, minimizes rejects. These extra values to you are the result of the Kaufman Double Extrusion Process of cold forging—a method that assures you stronger threaded fasteners than any other known process. It pays you to specify and buy Cleveland High Carbon Heat Treated Cap Screws. The Cleveland Cap Screw Co., 2917 East 79th St., Cleveland 4, Ohio; Warehouses, Chicago and Philadelphia.

CLEVELAND Top Quality FASTENERS

ORIGINATORS OF THE KAUFMAN DOUBLE EXTRUSION PROCESS
Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

and swivels to any angle. Reversible power crossfeeds for the table range from 0.002 to 0.016-inch per ram stroke. Horizontal table travel is



9½ inches, vertical travel is 5 inches and maximum distance from table to ram is 5½ inches.

Check No. 13 on Reply Card for more Details

Tool Grinder, Cutter

Gallmeyer & Livingston Co., Grand Rapids 2, Mich., is announcing a small universal cutter and tool grinder which has a hand wheel, located at the top of the machine, to raise and lower the column and head. Longitudinal movement is by either

hand wheel or lever on the front of the machine or by lever in the rear. Saddle cross movement is operated from practically any position by a hand wheel on the front of the machine or on the rear.

Graduated dials reading in thousandths of an inch are provided for both vertical and transverse movements. Head of the model 10 machine may be swiveled through 180 degrees and locked at any setting. Table may be swiveled to 90 degrees either side of center. Spindle is

MICRO-LIMIT...

PRECISION LIMIT SWITCH

A New Heavy Duty Precision Limit Switch for Severe Industrial Use!

ACTUAL SIZE

MICRO SWITCH now offers plant engineers a new precise, rugged heavy duty limit switch which permits a versatility of operation to meet the most difficult control requirements.

The operating head can be mounted in any of four positions. The roller arm can be adjusted in 870 different positive-lock operating positions through 360°. It may be adjusted in the shop to operate to the right, to the left or in both directions with ample overtravel.

The switching element, embodying the famous MICRO SWITCH snap-action principle, is sealed within a sturdy die cast housing. The actuating mechanism operates through a seal which protects the switch against dirt, dust and splash of oil or water. The switching element is easily replaceable. Large, heavy duty terminal screws and ample wiring space simplify installation.

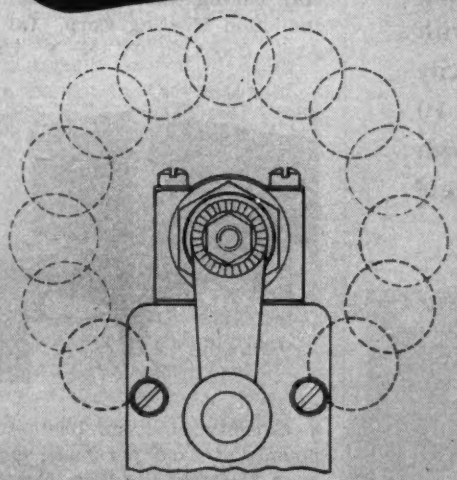
For limit switch applications where precise, positive precision control must be combined with severe usage and flexibility of adjustment, this MICRO-LIMIT precision limit switch can serve you well. For complete information, call an experienced MICRO SWITCH engineer at any of the offices listed.

MICRO . . .
first name in
precision switches

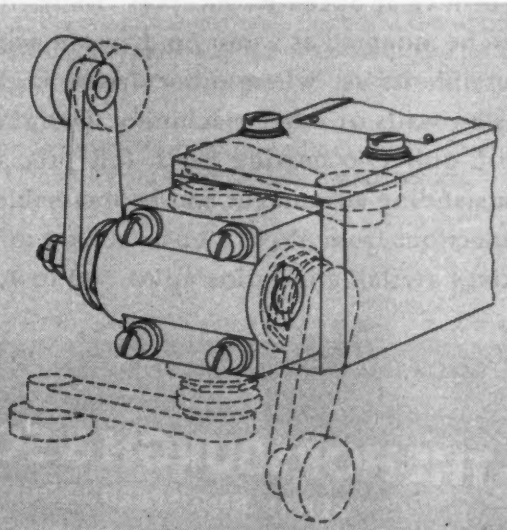
©1949 First Industrial Corp.

MICRO MS SWITCH
TRADE MARK ®
A DIVISION OF FIRST INDUSTRIAL CORPORATION
FREEPORT ILLINOIS U.S.A.

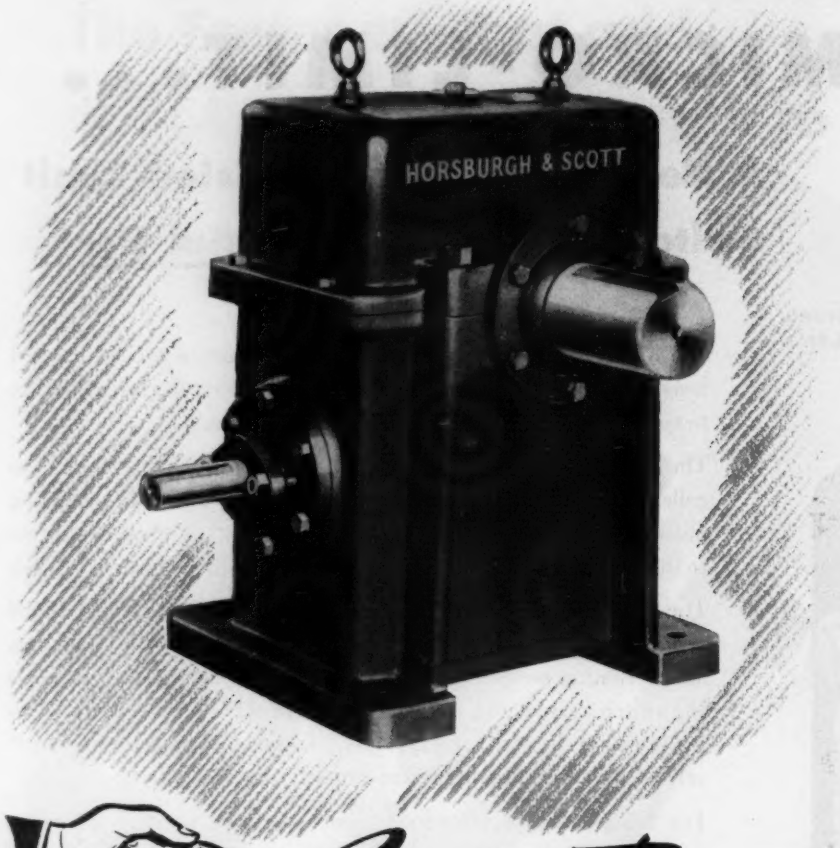
BRANCH OFFICES: Chicago • New York • Boston • Cleveland • Los Angeles
SALES REPRESENTATIVES: Portland • St. Louis • Dallas • Toronto



Roller arm may be positively locked in any of 870 different operating positions at intervals of approximately 0.4°.



Operating head can be mounted in any of the four positions shown. In addition, roller arm may be reversed as indicated.



Compact

WORM GEAR SPEED REDUCERS

by Horsburgh & Scott

An important feature of Horsburgh & Scott Worm Gear Speed Reducers is compactness . . . reducer can be mounted as a unit on driven machines . . . making possible its use where other drives might interfere with aisles, walls or other machinery. Designed for simplicity with only two moving parts, this precision unit has 10 outstanding advantages and is obtainable in 8 types with reductions from 3⅝ to 1 up to 10,000 to 1 . . . right-angle drives available in ratios up to 700 to 1.

Send note on Company Letterhead for Speed Reducer Catalog 46

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

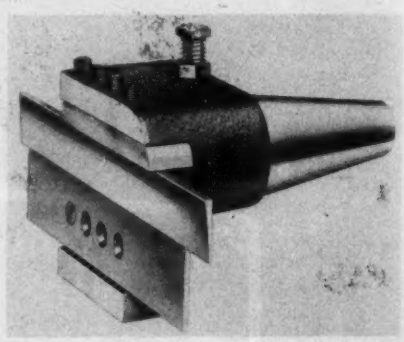
5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

driven through a V-belt by a ½-hp ball bearing motor. Two spindle speeds are provided. Table size is 5 x 30 inches and longitudinal table movement is 16 inches. Cross movement of wheel is 8 inches and vertical movement of spindle is 8 inches.

Check No. 14 on Reply Card for more Details

Cutoff Tool

Accommodating any standard ground or unground cutoff blade, a new type cutoff tool holder announced by BiggStava Co., 3357 Union Pacific Ave., Los Angeles 23, Calif., rests on a supporting blade which is slightly concave along the top edge while the lower edge of



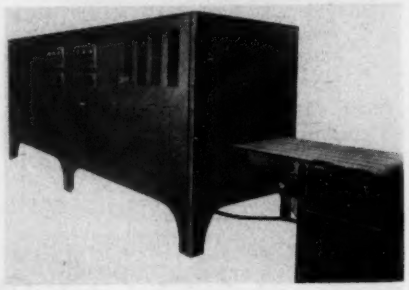
the cutoff blade is convexed to fit. This solid support eliminates chatter, tool breakage and slow operation.

Cutoff blade can be fed into the work under power with no chatter or vibration. Adjusting screw enables the operator to adjust the blade to the correct height without disturbing the adjustment of other tools.

Check No. 15 on Reply Card for more Details

Core Baking Tunnel

Core baking time is reduced from hours to minutes with the model M-1800-A Ther-Monic electronic core baking tunnel manufactured by Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y. Unit has



a capacity of from 1500 to 2000 pounds of sand per hour, depending upon moisture content. Cores up to 12 inches high and 30 inches wide may be accommodated.

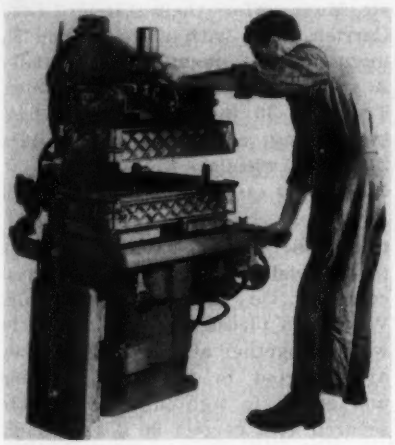
Cores are loaded directly on a con-

veyor which carries them at a predetermined rate between two heating electrodes. After the baking cycle, cores go directly to the inspection table. By pushbutton control the distance between the electrodes is adjusted to handle batches of different size cores within the prescribed range. Process involves dielectric heating principles used in conjunction with synthetic resin-type core binders. Heat is generated directly within the core itself. Burning of cores is impossible.

Check No. 16 on Reply Card for more Details

Match Plate Machine

Jolt-squeeze operation and four lifting operations required in match plate molding are performed by a new machine developed by Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O. It makes the job easier for the worker and enables an increase

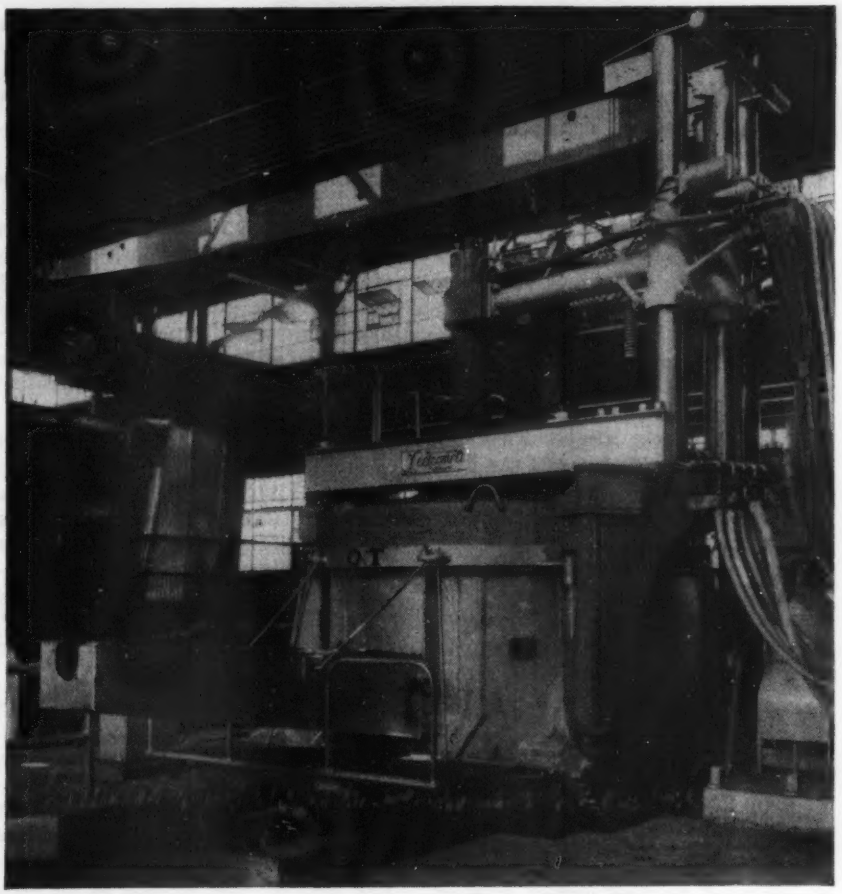


in size and weight of the molds without proportionately increasing the amount of labor required. Heavy lifting hand operations are practically eliminated from this method of making iron and steel castings which utilizes the match plate pattern and flask into which molding sand is poured and tightly packed in order to form a cavity in the shape of the casting to be produced.

Check No. 17 on Reply Card for more Details

Spring Tester

Wide variety of compression and extension springs may be subjected to test conditions, with the universal spring fatigue testing machine built by Krouse Testing Machine Co., 573 E. 11th Ave., Columbus 3, O. Basic parts of the machine are preloading head, cyclic loading head and driving oscillator. The machine itself is of forced oscillation type, operating in resonance frequency range of spring and oscillating arm assembly.



A good roof is of prime importance to good furnace performance. Lectromelt gives you the best.

The roof and superstructure of this Moore Rapid Lectromelt Size OT Furnace is maintained in proper alignment on the furnace body by the use of dowel pin and socket construction. These dowel pins are arranged so that the roof automatically sits down on them when it is swung back and lowered into position. The dowel pins and sockets are located both at the top of the furnace body—at the approximate level of the bezel ring—and lower down on the furnace shell, thus eliminating the necessity of hold-down clamps on the roof ring.

Lectromelt furnaces are built in capacities ranging from 250 pounds to 100 tons. Write for complete details today.

PITTSBURGH LECTROMELT FURNACE CORP.

PITTSBURGH 30, PA.

MOORE RAPID Lectromelt FURNACES

manufactured in: CANADA, Lectromelt Furnaces of Canada, Ltd., Toronto 2; ENGLAND, Birlec, Ltd., Birmingham; SWEDEN, Birlec Elektkougnar A/B, Stockholm; AUSTRALIA, Birlec Ltd., Sydney; FRANCE, Stein et Roubaix, Paris; BELGIUM, S. A. Belge Stein et Roubaix, Bressoux-Liege; SPAIN, General Electrica Espanola, Bilbao; ITALY, Forni Stein, Genoa.

Machine has a capacity of 5000 pounds with a speed range of 100 to 1150 cycles per minute. Upper head may be adjusted to accept springs from 2 to 18 inches long with outside diameters up to 6 inches. Stroke is infinitely variable between 0 and 4½ inches.

Check No. 18 on Reply Card for more Details

• • •

BATTERY: Known as Exide-Manchex, a new battery offered by Electric Storage Battery Co., Philadelphia 32, Pa., is of the sealed glass jar type. One of its features is the positive plate known as the manchester type which consists of a grid cast of lead antimony alloy in which active material is in the form of pure lead buttons. Buttons are forced by hydraulic pressure into circular openings in the grid.

Check No. 19 on Reply Card for more Details

HARDNESS TESTER: A new and improved Rockwell hardness tester, model C-8A, C-12A and C-16A, is offered by Clark Instrument Inc., Dearborn, Mich. It features a spindle housing and beam assembly that may be replaced by the owner without special skill or tools. It can be used for testing of hard or soft steel, brass, aluminum, cast iron, copper, other metals, alloys and plastics.

Check No. 20 on Reply Card for more Details

MAGNETIC STRAIN GAGE: A magnetic strain gage which provides a simple method of directly measuring small distortions in a static member resulting from a tensive or compressive load is announced by Westinghouse Electric Corp., Pittsburgh 30, Pa. Unit consists of the strain gage enclosed in a water-tight case and pilot bar sensitive to force as small as 20 pounds which is mounted on supporting member and a controller with indicating dial.

Check No. 21 on Reply Card for more Details

WELDING CURTAINS: A. Smith & Sons, Philadelphia 23, Pa., offers welding curtains designed to confine the welding operation to a given area and protect other workers and passers-by from harmful and direct rays given off by welding operation. Standard curtains are furnished with eyelets across the top spaced about 10 inches apart with two in each lower corner.

Check No. 22 on Reply Card for more Details

TUBE UNIONS: A lightweight, quick connecting tube union for joining flared tubing is available from Roylyn Inc., Glendale, Calif. Designated as the 1900 series union, it is available in 1½, 2, 2½, 3 and 4-inch sizes in either steel or aluminum alloy.

Check No. 23 on Reply Card for more Details

ALUMINUM FINISH: Chemclean Products Corp., New York 13, N. Y., offers Chemlustre, a new finish for aluminum. It gives badly weathered aluminum a uniform and bright appearance and also gives aluminum articles a highly lustrous semisatin finish.

Check No. 24 on Reply Card for more Details

GATE VALVE: Hydro-Aire Inc., Burbank, Calif., offers a new type solenoid-controlled gate valve for high temperature application. It operates at ambient temperature ranges of minus 65° F to 250° F, but can handle air or liquids up to 550° F.

Check No. 25 on Reply Card for more Details

FASTENER: Speed Clinch fastener, offered by Tinnerman Products Inc., Cleveland 13, O., is used in applying asbestos cement siding to gypsum sheathing. It is a two-headed nail-like fastener that spreads at the base as it is driven with the hammer.

Check No. 26 on Reply Card for more Details

LUBRICANT: Lubeway, a new dual purpose oil for use in hydraulically operated machine tools that pressure-feed way lubricant from the hydraulic system, is introduced by Sun Oil Co., Philadelphia 3, Pa. It is available in two viscosities.

Check No. 27 on Reply Card for more Details

PUMP: Graymills Corp., Evanston, Ill., offers pump H-2225 which is only 7 inches high including its 1/25-hp motor. Inlet is through the top of the impeller housing. It is designed for use in shallow sumps and for liquids of moderate viscosities

Check No. 28 on Reply Card for more Details

PICKLING ACID: Nielco Laboratories, Detroit, Mich., offer Nielite D pickling acid. It is a compound acid produced from a phosphoric acid base and contains neither sulphuric or hydrochloric acids. It is put up in a concentrated liquid ready for mixing with water.

Check No. 29 on Reply Card for more Details

SMOKE INDICATOR: Type A20C-1 photoelectric smoke indicator indicates the density of smoke passing through the flue or breaching of a heating or power plant and signals when this density approaches values prescribed by municipal smoke ordinances. It is manufactured by Photoswitch Inc., Cambridge 42, Mass.

Check No. 30 on Reply Card for more Details

UTILITY LAMP: The portable utility lamp, made by Pompton Mfg. Co., Pompton Plains, N. J., is equipped with a spring clamp provided with rubber insulated grips that can be clamped on any projection. It enables user to spot the light exactly where it is most useful in a machine.

Check No. 31 on Reply Card for more Details

CORE DRILL: An improved design core drill that eliminates major objection to carbide tipped tools in core drilling operations is announced by Super Tool Co., Detroit 13, Mich. Wear strips of wear resistant metal are brazed on the entire length of the flutes of the drill.

Check No. 32 on Reply Card for more Details

CARRIER: Market Forge Co., Everett, Mass., offers their standard Load Carrier truck with a 275 gallon aluminum tank mounted in a cradle. A steel tank may be substituted. Truck is 30 inches wide and 63⅝ inches long; equipped with two 12 x 2½ inch wheels,

Check No. 32 on Reply Card for more Details

CLAMPS: A time-saving accessory for the welder is offered by Thermacote Mfg. Co., Los Angeles 13, Calif. When two pieces of metal are to be welded together at right angles, they are inserted in the Korner-Klamp and screw is tightened. Pieces are secured at a correct 90 degree angle regardless of whether or not two pieces are of same or different thickness, maximum thickness being ⅝-inch.

Check No. 34 on Reply Card for more Details

INDICATING PYROMETER: Pyrometer indicators with dials calibrated in both Fahrenheit and Centigrade are offered by Assembly Products Inc., Chagrin Falls, O. Recommended for measuring temperature in ceramic kilns, furnaces, ovens or in various types of baths. Offered in ranges for heat up to 2500° F and 1370° C.

Check No. 35 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

WITH steel ingot production still booming along only a few points below the capacity level attained earlier this year, the question is pointed up as to where all the steel is going. Of considerable interest before demand began to sag badly some weeks back, this question today is increasingly pertinent in the face of reported order cancellations and curtailed buying. The answer appears to be found primarily in the fact tremendous tonnage is still moving into the usual consuming channels against old commitments, reflected in mill backlogs, and also in the fact substantial new buying is being done.

PRODUCTION— Actually a high level of business, such as experienced over recent years, usually engenders considerable momentum well after the peak in demand has passed. Consequently, the present robust production should not be too surprising. The recession in buying to date, on the whole, has been moderately gradual. Moreover, the possibility of labor disturbances in late spring and early summer, especially in the soft coal fields, may be contributing somewhat to activity by virtue of a certain amount of protective buying. However, current production is well in excess of new orders and mill backlogs are tapering.

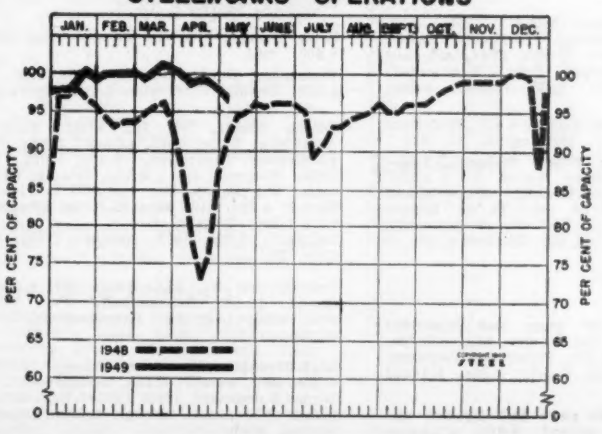
OPERATIONS— Most leading steelmakers look for continued high operations over the remainder of the current quarter. The outlook for third and fourth quarters, however, is hazy. In fact, some producers think they may have to start retrenching soon unless order volume increases, especially the smaller interests. As a matter of fact, certain producers that had been quoting premium prices already have cut their operations appreciably, and if it were not for the sustaining influence of the major producing units, average ingot operations in the various districts would be down noticeably. At present the national ingot rate is declining slowly. Last week it dropped one point further to 97 per cent of capacity.

PRICES— Steel buyers are watching price developments closely. Last week a number of additional reductions were announced, chiefly affecting premium prices which have been in the process of being shaved to competitive levels for quite some time past. Most recent reductions applied to carbon plates, fence posts, light rails, rail steel bars, rail steel reinforcing bars, high-strength low-alloy hot and cold-rolled sheets and strip, southern pig iron, and cast iron pipe. Over the past week or so certain producers have effected revisions in extra cards on sheets and strip, bringing lists in line with competitive levels. Further extra card adjustments are in the offing.

COMPOSITES—STEEL's arithmetical price composite on steelmaking pig iron slipped to $45.85 last week from $46.10 for the preceding week and compared with $39.18 for the like week a year ago. The composite on finished steel eased to $93.55 from $94.45 and compared with $80.27 for the like week a year ago. Semi-finished steel composite held at $66.72 and compared with $68.62 a year ago, while the composite on steelmaking scrap held at $23.25 and compared with $40.67 a year ago.

RAW MATERIALS—With demand for finished steel on the downtrend and buyers experiencing less and less difficulty placing tonnage for fairly early shipment, raw material supply conditions continue to show steady improvement. Pig iron producers catering to the merchant trade are piling tonnage and in general anticipate little improvement in demand for weeks to come. Some producers are diverting blast furnace capacity from merchant iron to production of steelmaking grades. At the same time the impasse in the scrap market continues. Prices on the major open-hearth and cast grades of scrap are unchanged. However, reviving interest in blast furnace scrap has served to up prices on this grade of material $1 per ton at one point. Some trade leaders think the scrap market now is riding bottom.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended May 7	Change	Same Week 1948	Same Week 1947
Pittsburgh	95.5	— 2.5	96	100.5
Chicago	100.5	+ 1.5	87.5	78.5
Eastern Pa.	93	None	86	91.5
Youngstown	105	None	103	91
Wheeling	91.5	— 0.5	86	81.5
Cleveland	98	— 3	93.5	97
Buffalo	101.5	None	87.5	88.5
Birmingham	100	None	100	99
New England	62	—15	81	95
Cincinnati	103	— 3	91	84
St. Louis	75.5	— 4.5	89.5	68.5
Detroit	97	—11	100	90
Western	92	— 1.5	..	..
Estimated national rate	97	— 1	92	92

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	May 7	Apr. 30	Month Ago Apr. 1949	Year Ago May 1948	5 Years Ago May 1944
Finished Steel	$93.55	$94.45	$94.48	$80.27	$56.73
Semifinished Steel	66.72	66.72	68.45	68.62	36.00
Steelmaking Pig Iron	45.85	46.10	46.16	39.66	23.00
Steelmaking Scrap	23.25	23.25	24.06	40.67	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Mar. 1949	4.04073c
Feb. 1949	4.06149c
Jan. 1949	4.05394c
Mar. 1948	3.63079c
Mar. 1944	2.42750c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. March, 1949, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	May 7, 1949	Apr. 1949	Feb. 1949	May 1948
Steel bars, Pittsburgh mills	3.35c	3.35c	3.45c	2.875c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8164	3.365
Steel bars, Chicago mills	3.35	3.35	3.35	2.875
Shapes, Pittsburgh mills	3.25	3.25	3.275	2.775
Shapes, Chicago mills	3.25	3.25	3.25	2.775
Shapes, del. Philadelphia	3.4918	3.4918	3.48	2.98
Plates, Pittsburgh mills	3.40	3.50	3.50	2.925
Plates, Chicago mills	3.40	3.40	3.40	2.925
Plates, del. Philadelphia	3.6348	3.6348	3.7256	3.21
Sheets, hot-rolled, Pittsburgh mills	3.25	3.26	3.275	2.775
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.50
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.775
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.50
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.275	3.50	3.275	3.05
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.775
Bright basic, wire, Pittsburgh	4.15	4.15	4.325	3.725
Wire nails, Pittsburgh mills	5.15	5.15	5.775	5.125
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$60.00
Slabs, Chicago	52.00	52.00	52.00	45.00
Rerolling billets, Pittsburgh	52.00	52.00	59.00	45.00
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.175c

* Nominal. † 1.50 lb coating.

Pig Iron

	May 7, 1949	Apr. 1949	Feb. 1949	May 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$41.038
Basic, Valley	46.00	46.00	46.00	39.00
Basic, eastern, del. Philadelphia	49.39	49.6175	50.3002	42.17
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	40.538
No. 2 fdry., del. Philadelphia	49.89	50.1175	50.8002	42.67
No. 2 foundry, Chicago	46.25	46.25	46.25	39.00
No. 2 foundry, Valley	46.50	46.50	46.50	39.50
Southern No. 2 Birmingham	41.38	43.38	43.38	38.63
Southern No. 2 del. Cincinnati	47.43	49.43	49.43	43.90
Malleable, Valley	46.50	46.50	46.50	39.50
Malleable, Chicago	46.50	46.50	46.50	39.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	56.50
Ferromanganese, f.o.b. Etna, Pa.	175.00	175.00	163.00	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$24.00	$25.12	$40.00	$40.25
Heavy melt. steel, No. 2, E. Pa.	20.00	20.69	35.69	39.00
Heavy melt. steel, No. 1, Chicago	23.00	23.75	35.75	39.25
Heavy melt. steel, No. 1 Valley	22.00	22.75	37.75	40.25
Heavy melt. steel, No. 1 Cleveland	18.50	20.38	37.25	39.75
Heavy melt. steel, No. 1, Buffalo	23.50	24.38	40.50	43.00
Rails for rerolling, Chicago	27.75	31.31	48.19	51.75
No. 1 cast, Chicago	27.50	30.25	44.25	69.00

Coke

Connellsville, beehive furnace	$14.25	$14.44	$14.50	$12.94
Connellsville, beehive foundry	16.75	17.00	17.00	15.06
Chicago, oven foundry, ovens	20.40	20.40	20.40	19.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $57, Conshohocken, Pa.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $65-$75 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & 5/16-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Los Angeles; 4.15c Monessen, Pa. Basic open-hearth and bessemer, not resulphurized, 7/23 to 47/64-in., inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.55c, Ecorse, Mich.; 4.00c Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 4.40c, Atlanta.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., and Moline, Ill.; 4.00c, Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.50c, Camden, N. J.; 5.40c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Struthers, O.; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 3.85c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.75c, Conshohocken, Pa.; 3.95c, Pittsburg, Torrance, Calif.; 4.15c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 5.05c, Torrance Calif.; 5.25c, Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 4.80c, Kokomo, Ind.; 5.15c, Pittsburgh, Torrance, Calif.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.30c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill., Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren. Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O. Motor: 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O. Dynamo: 7.50c, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill, except: 10.60c, Brackenridge, Pa.; 58, 9.30c, mill, except: 11.30c, Brackenridge, Pa.; 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except; 5.15c, Youngstown, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Atlanta; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 4.65c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less); 4.00c, mill, except: 4.00-4.25c, Warren, O.; 4.00-4.50c, New Castle, Pa., Youngstown; 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.40-4.50c, Detroit; 4.50c New Haven, Conn., West Leechburg, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.85c, Wallingford, Conn.; 5.75c, Los Angeles; 5.55c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.25-4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Struthers, O.; 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich., mill.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point, Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.50c, Coatesville, Pa.; 3.55c, Conshohocken, Pa.; 3.65c, Claymont, Del., Ecorse, Mich.; 3.95c, Harrisburg, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.50c, Houston; 5.30c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.40c, Youngstown; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.75c, Phoenixville, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 3.80c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 5.15c, Struthers, O.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo., Atlanta, Buffalo; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa., Portsmouth, O.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calf. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 109, Worcester, Mass.; 110, Minnequa, Colo., Atlanta, Cleveland; 123, Pittsburg, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Portsmouth, O., Kokomo, Ind.; 116, Minnequa, Colo.; 121, Atlanta; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 126 Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 114, Duluth; 116, Moline, Ill.; 122, Minnequa, Colo.; 125, Johnstown, Pa.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 110, Atlanta; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
321	34.00-34.75	44.50-45.75	45.50-49.00
347	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410	22.75-23.00	26.50-27.00	32.00-33.00
416	23.25-23.50	28.25-33.50	32.50-33.50
430	23.25-23.50	27.00-27.50	34.75-35.50
446	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding— 10%	Plates —Cladding— 20%	Sheets —Cladding— 10%	Sheets —Cladding— 20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

For prices of bolts, nuts, rivets, washers please refer to May 2 issue, page 153.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton. Discounts from base follow:

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	39½–41½	10–12½	1	46–48½	26½–32
¼	37½–39½	11–14½	1¼	46½–49	27–32½
⅜	34–36	6–10½	1½	47–49½	27½–33
½	40½–43	19½–25	2	47½–50	28–33½
¾	43½–46	23½–29	2½, 3	48–50½	28½–34
			3½ & 4	44½	27½

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	40½	21	38½	19	28–38½	8½–21½
2½	44½	25	41½	22	33½–41½	14–24½
3	44½	25	41½	22	36–41½	16½–24½
3½&4	42½–46½	22–27	43½	24	38½–43½	19–26½
5 & 6	42½–44½	22–27½	43½	24	43½	23½–26½
7	....	....	....	....	43½	25½

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	12½	1¼	46–48	27½–31½
¼	38½	14½	1½	46½–48½	28–32
⅜	35	9½	2	47–49	28½–32½
½	40–42	20–24	2½ & 3	47½–49½	29–33
¾	43–45	24–28	3½ & 4	43½	26½
1	45½–47½	26–31			

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	20	37½	18	27–37½	7½–20½
2½	43½	24	40½	21	32½–40	13–23½
3	43½	24	40½	21	35–40½	15½–23½
3½-4	41½–45½	21½–26	42½	23	37½–42½	18–25½
5 & 6	41½–43½	21½–26½	42½	23	42½	22½–25
8	45½	27½	44½	23½–24	44½	23½–26½
10	45	27	44	23½	44	23–26
12	44	26	43	22½	43	22–25

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Lap Weld Blk.	Lap Weld Gal.
⅜	+59½	+91	1¼	+22	+48½
½	+20½	+48	1½	+15½	+41
⅝	+10½	+37	2	+ 7½	+32
1 and 1¼	+ 4½	+28	2½-3½	+ 5	+27½
1½	— 1½	+24½	4	List	+21½
2	— 2	+24	4½-8	+ 2	+23
			9-12	+12	+32½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″, inclusive.

O.D.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	.....	13.39-14.64	13.00	13.00
1¼	13	.....	15.87-17.34	13.21	15.39
1½	13	16.45	17.71-19.35	14.60	17.18
1¾	13	18.71	20.15-22.02	16.60	19.54
2	13	20.96	22.56-24.66	18.60	21.89
2¼	13	23.36	25.16-27.50	20.73	24.40
2¼	12	23.54-25.73	27.70-30.28	22.83	26.88
2½	12	25.79-28.19	30.33-33.15	25.02	29.41
2¾	12	27.33-29.87	32.14-35.13	26.51	31.18
3	12	28.68-31.35	33.76-36.90	27.82	32.74
3¼	11	33.39-36.50	39.29-42.95	32.39	38.11
3½	11	35.85-39.19	42.20-46.13	34.78	40.94
4	10	44.51-48.65	52.35-57.22	43.17	50.78
4½	9	58.99-64.47	69.42-75.88	....	....
5	9	68.28-74.64	80.35-87.82	....	....
6	7	104.82-114.57	123.33-134.81	....	....

Pipe Cast Iron: Class B, 6-in. and over, $82.50-$93.50 per net ton, Birmingham; $87.50, Burlington, N. J.; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill, except: $3.30, Minnequa, Colo.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $3.55 per 100 lb, Williamsport, Pa., Huntington, W. Va.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Birmingham, furnace	38.88-42.88	39.38-43.38	....	....
Cincinnati, del.	....	45.43-49.43	....	....
Buffalo, furnace	46.00	46.50	47.00	....
Boston, del.	54.92	55.42	55.92	....
Rochester, del.	47.95	48.45	48.95	....
Syracuse, del.	49.39	49.89	50.39	....
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del.	....	51.28-51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	52.50	53.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	49.40	49.90	50.40	....
Ironton, Utah, furnace	47.00	47.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	48.00	48.50	49.00	49.50
Philadelphia, del.	49.39	49.89	50.39	50.89
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)..$59.50
6.51-7.00.. 60.50 9.01- 9.50. 65.50
7.01-7.50.. 61.50 9.51-10.00. 66.50
7.51-8.00.. 62.50 10.01-10.50. 67.50
8.01-8.50.. 63.50 10.51-11.00. 68.50
8.51-9.00.. 64.50 11.01-11.50. 69.50

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $78.50 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Piglets, Si 16%, $91, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorous. F.o.b. furnace, Lyles, Tenn....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central furnace, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Diam. (Inches)	Length (Inches)	Cents per lb. f.o.b. plant
Graphite		
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
Carbon		
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace	$13.50-15.00
Connellsville, foundry	16.00-17.50
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60
Oven Foundry Coke	
Kearney, N. J., ovens	$22.00
Everett, Mass., ovens. New England, del.‡	22.70
Chicago, ovens	20.40
Chicago, del.	†21.85
Detroit, del.	24.16
Terre Haute, ovens	20.20
Milwaukee, ovens	21.15
Indianapolis, ovens	19.85
Chicago, del.	23.19
Cincinnati, del.	22.66
Detroit, del.	23.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens.	20.40
Portsmouth, O., ovens.	19.50
Detroit, ovens	20.65
Detroit, del.	•21.70
Buffalo, del.	22.75
Flint, del.	22.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: •, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens (Effective as of Oct. 1)	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50
(Effective as of Oct. 25)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting,, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)

Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	17.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26–$28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines	$0.90

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
New York (city)	6.00	6.51‡	7.20	5.82	...	5.77	6.56	8.68	5.53	5.90	7.36
New York(c'try)	5.80	6.31‡	7.00	5.62	...	5.57	6.36	8.48	5.33	5.70	7.16
Boston (city) ..	6.10	6.70	7.21	5.80	...	5.67	6.42	8.72	5.57	5.95	7.40
Boston (c'try)..	5.95	6.55	7.06	5.65	...	5.52	6.27	8.57	5.42	5.80	7.25
Phila. (city)...	5.72	6.64	7.33	5.60	...	5.55	6.34	8.40	5.25	5.53	6.74
Phila. (c'try)...	5.57	6.59	7.18	5.45	...	5.40	6.19	8.25	5.10	5.38	6.59
Balt. (city) ...	5.46†	6.36	7.26	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31†	6.21	7.11	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse) .	5.84-6.00	...	...	5.90	...	5.91-5.95	6.61	...	5.85-5.89	6.05-6.09	7.50-7.54
Buffalo (del.)..	5.00	6.05	7.85	5.49	6.50	5.20	6.05	10.13	5.25	5.50	7.06
Buffalo (w'hse)	4.85	5.90	7.70	5.34	6.35	5.05	5.90	9.98	5.10	5.35	6.91
Pitts. (w'hse)..	4.85†	5.75[8]†	6.95	5.00	6.00	4.90	5.65	9.60	4.90	5.05-5.10	6.55
Detroit (w'hse).	5.42§	6.22[8]†	7.53	5.42	6.42-6.73	5.48	6.15	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00†	5.90‡	6.80-6.96	5.15-5.18	6.15	5.15-5.16	5.85	8.24-8.40	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85†	5.75‡	6.65-6.81	5.00-5.03	6.00	5.00-5.01	5.70	8.24-8.25	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26	5.94	6.98	5.38	6.10	5.43	6.18	...	5.43	5.63	7.03
Chicago (city).	5.00-5.20	5.90[8]‡	7.10	5.00	6.67-6.83	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75[8]‡	6.95	4.85	6.52-6.68	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee(city)	5.18-5.28	6.08[8]‡	7.28	5.18	6.82-7.01	5.23	6.03	8.43[9]	5.23	5.43	6.88
St. Louis (del.)	5.37§	6.27[8]‡	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.22§	6.12[8]‡	7.29	5.19	6.49	5.24	6.04[12]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.83	...	5.15	5.40	7.73[20]
Birm'ham(c'try)	5.05§	...	6.45	5.05	...	5.00	6.68	...	5.00	5.25	7.58[20]
Omaha, Nebr...	6.13	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60§	8.05	8.20†	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse) .	6.45§	7.90	8.05†	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15[21]	7.50	8.10	6.75[21]	8.25[18]	5.90[21]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma.	6.35[17]	7.90[5]	8.25	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [2]—1000 to 4999 lb; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [12]—1000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † base price, does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as annealed; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices. 1c for max. 0.30% C. 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb. 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb. 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.03% C 31.85c per lb of contained Cr, 0.04% C 29-75c, 0.06% C 28.75c, 0.10% C 28.25c- 28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade. $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered, Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lots 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.) C.l., lump, bulk, regular 1¢ per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.15c per lb of alloy, ton lots packed 9.55c, 200 to 1999 lb 9.90c, smaller lots 10.40c, Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr.). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing, approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (**Large size**—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(**Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

For prices of other ferroalloy products please refer to May 2 issue, page 174.

Metal Output Drops as Prices Sag

Northern Michigan copper and Tri-State zinc and lead mines curtail operations. Producers still seeking price levels that will attract buying support

New York—Drop in custom smelter copper prices to the 18.50-cent level has resulted in curtailment of production and any further decline will cut new supplies further. Suppliers are still seeking a price level that will attract consumer buying interest. Zinc and lead prices held unchanged last week, although sales of these metals also were light.

Copper—Custom smelters reduced prices 1½ cents per pound on May 2 to the basis of 18.50c a pound for electrolytic, delivered to Connecticut Valley points. This represents a drop of 5 cents a pound since Mar. 29. Phelps Dodge Corp. is the only major mine producer that has officially named a lower price during this period, having reduced prices to 20.00c on May 3. Due to the negligible volume of business done at the producers' price level, however, it is not a factor in determining the general market level.

Calumet & Hecla Consolidated Copper Co. stopped all mining operations at its copper mines in Michigan as of May 1. E. R. Lovell, president, said that there suddenly "appears to be no demand for copper whatever" and that the company "can resume mining only when there is a demand for copper at a price which will permit it to operate without loss."

Copper Range Co. is considering whether or not to close down its northern Michigan mines because of the copper price drop, according to Morris LaCroix, president. The price at which copper stabilizes will determine the course of action, he said.

E. T. Stannard, president, Kennecott Copper Corp., said "now that the copper price has been reduced by 5 cents a pound it would seem that buying should soon be resumed. We have been in a period of readjustment insofar as all business is concerned and I believe that three factors have contributed to the decline in the copper price.

"They are: First, there has been a very considerable falling off in building and general business; second, an apparent universal desire on the part of consumers to reduce their inventories; third, the feeling that the general commodity index . . . has been too high."

Brass Mill Products—Revere Copper & Brass Inc. and Scovill Mfg. Co. reduced their prices for copper products and brass mill goods last week to conform to a price of 18.50c a pound for copper and 12.50c for zinc.

Lead—Bulk of the small business which is being transacted in the lead market is being done on a sliding price scale, rather than at a flat price.

Smelters' receipts of lead in ore and scrap during March increased sharply to 62,689 tons from 46,610 tons in February, according to the American Bureau of Metal Statistics. Total receipts in the first quarter amounted to 156,754 tons compared with 128,310 tons in the like 1948 period.

Consumption of lead by cable manufacturers amounted to 184,300 tons in 1948, compared with 158,700 tons in 1947, and was the largest tonnage reported since 1930.

Zinc—As a result of the drop in zinc prices to 12.50c, East St. Louis, additional mines in the Tri-State district have suspended operations, making about 40 per cent of the district's production facilities idle. Consumers have not re-entered the market actively, despite the recent price cuts.

Tin—Import licenses for limited amounts of off-grade pig tin (99.65 per cent tin content or less) will be granted to private purchasers, the Department of Commerce has announced. Applications (ODC-1041) should be addressed to Nonferrous Metals & Minerals Division, Office of Domestic Commerce, Department of Commerce, Washington 25. No private imports of pig tin have been permitted since the early days of the war.

Metal Price Averages For April

Electrolytic Copper, del. Conn.	21.774
Lead, St. Louis	15.017
Prime, Western Zinc, E. St. Louis	14.058
Straits Tin, New York	103.000
Primary Aluminum Ingots, del.	17.000
Antimony, f.o.b. Laredo, Tex.	38.500
Nickel, f.o.b. refinery	40.000
Silver, New York	71.500

Output of refined tin by the Longhorn smelter amounted to 2851 tons in April compared with 3104 in March and 2906 tons in April, 1948. Production in Malaya rose to 5006 tons of fine tin in March, a postwar high.

Aluminum—With the exception of cable, sellers of aluminum products report supply in balance with demand. Distribution of aluminum continues under allocation, although retention of this system is merely a formality since allocations in reality now represent sales quotas for the company's representatives. Relatively prompt deliveries are available on nearly all aluminum products.

Current production schedules are geared closely with incoming orders, which results in little, if any, production going into inventory. Sellers contend demand is holding up well in the face of easier steel supply outlook. The industry is confident of holding a substantial portion of new markets developed in recent years.

No price weakness in aluminum is indicated at the moment. The price level of 17.00c for primary ingot aluminum is still 3 cents a pound below the 1939 level, despite the 2-cent advance from the 15-cent level which prevailed throughout the war.

Production of primary aluminum in February totaled 49,749 short tons, about 7 per cent less than January output, according to the Bureau of Mines. The decline was attributable to the shorter month as average daily production showed a slight increase.

Brass Mill Shipments Drop

Baltimore—A confused condition in the copper market caused by a split in the prices quoted by custom refiners, producers and fabricators, plus the determination of consumers to reduce inventories, has brought about a sharp decrease in shipments and earnings after a satisfactory first quarter, according to C. Donald Dallas, chairman, Revere Copper & Brass Inc., in a statement to stockholders submitted at the annual meeting of the company here May 3. His report follows:

"Shipments and earnings for the first three months of 1949 were slightly less than for the corresponding period of 1948.

"Orders and shipments currently, however, are showing a sharp decrease due to the apparent determination of consumers to reduce their inventories.

"This trend is accentuated by the split price in the copper market, ranging from 18.50c a pound on the part of the custom smelters to 23.50c a pound on the part of the producers, while the condition in the scrap market appears to indicate a still further decrease in price.

"It is timely that we should ask why producers controlling 80 per cent of the domestic production can quote prices considerably higher than those at which they are at the same time selling copper through their 100 per cent owned fabricating subsidiaries.

"The sooner the inevitable postwar adjustment of the price of copper is completed, the healthier and sounder it will be for the industry.

"When the copper market stabilizes at a reasonable level, there should be a resumption of buying."

Aluminum Cable Shipments

Louisville, Ky.—Shipments of Reynolds aluminum conductor totaled 447,170 pounds during April, according to David P. Reynolds, vice president and general sales manager of Reynolds Metals Co., this city. Mr. Reynolds said that the first carload shipment was made on Apr. 15, and 10 additional carloads were shipped to rural electric cooperatives during the following 15-day period.

"All cooperatives who had orders approved and deposits in during March were included in the April shipping schedule. We have advanced the program fully eight months insofar as production and shipments are concerned," he said.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic 18.50, Conn. Valley; Lake, Nom., Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.75-17.00c; 88-10-2 (No. 215) 25.50c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 13.50-14.50c.

Zinc: Prime western 12.50, brass special 12.75c, intermediate 13.00c, East St. Louis; high grade 13.50c, delivered.

Lead: Common 14.80-14.85c; chemical, 14.90c; corroding 14.90-14.95c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloy (6-6 type) 17.25-17.50; No. 12 foundry alloy (No. 2 grade) 16.50-17.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.00c; grade 2, 16.00c; grade 3, 15.00c; grade 4, 14.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $83-$86 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 71.50c per ounce.

Platinum: $72-$75 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 33.68; yellow brass 30.77; commercial bronze, 95%, 33.68; 90%, 33.28; red brass, 85%, 32.36; 80%, 31.97; best quality, 31.56; nickel silver, 18%, 43.85; phosphor-bronze, grade A, 5%, 52.72.

Rods: Copper, hot rolled 29.53; cold drawn 30.78; yellow brass, free cutting, 25.32; commercial bronze, 95% 33.37; 90% 32.97; red brass 85% 32.05; 80% 31.66.

Seamless Tubing: Copper 33.72; yellow brass 33.78; commercial bronze 90% 35.94; red brass 85% 35.27; 80% 34.88.

Wire: Yellow brass 31.06; commercial bronze, 95% 33.97; 90% 33.57; red brass, 85% 32.65; 80% 33.26; best quality brass 31.85.

Copper Wire: Bare soft, f.o.b. eastern mills, c.l. 25.92½c, l.c.l. 26.42½c; weatherproof, f.o.b. eastern mills, c.l. 27.22½c, l.c.l. 27.72½c; magnet, delivered, c.l. 30.00, 15,000 lb or more 30.25c, l.c.l. 30.75c.

ALUMINUM

Sheets and Circles: 2s and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...	
0.156-0.203	41.0	...	...	
0.219-0.313	38.0	...	...	
0.344	37.0	...	47.0	
0.375	36.5	45.5	44.0	
0.406	36.5	...	...	
0.438	36.5	45.5	44.0	
0.469	36.5	...	...	
0.500	36.5	45.5	44.0	
0.531	36.5	...	...	
0.563	36.5	...	41.5	
0.594	36.5	...	...	
0.625	36.5	43.0	41.5	
0.656	36.5	...	...	
0.688	36.5	...	41.5	
0.750-1.000	35.5	40.5	39.0	
1.063	35.5	...	37.5	
1.125-1.500	34.5	39.0	37.5	
1.563	34.5	...	37.5	
1.625	33.5	...	36.5	
1.688-2.000	33.5	...	...	
2.125-2.500	32.5	...	...	
2.625-3.375	31.5	...	...	

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $20.00 per cwt; cut coils, $20.00. Traps and Bends: List price plus 53%.

ZINC

Sheets, 17.00c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 16.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 15.25c; over 12-in., 16.25c.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c, Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 31.84c; oval 31.34; cast 29.87c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00c, f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,900 lb, 17.00c, f.o.b. Niagara Falls, N. Y.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 42.50c, f.o.b. Cleveland; 43.00c, Detroit; 42.00c, Philadelphia.
Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00c; 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	17.625	17.625	16.875
Yellow brass	15.000	14.750	14.250
Commercial Bronze			
95%	16.750	16.500	16.000
90%	16.500	16.250	15.750
Red Brass			
85%	16.375	16.125	15.625
80%	16.125	15.875	15.375
Best Quality (71-80%)	16.000	15.750	15.250
Muntz Metal	14.375	14.125	13.625
Nickel, silver, 10%	16.875	16.625	8.4375
Phos. bronze, A	19.375	19.125	18.125
Naval brass	14.875	14.625	14.125
Manganese bronze	14.875	14.625	14.000

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, f.o.b. shipping point, carload lots)

No. 1 copper 13.00, No. 2 copper 12.00, light copper 11.00, composition red brass 10.00, auto radiators 7.50-7.75, heavy yellow brass 7.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.00, No. 2 copper 12.00, light copper 11.00, refinery brass (60% copper), per dry copper content 11.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 12.25-12.50, No. 2 11.25-11.50, light copper 10.25-10.50, No. 1 composition red brass 8.50-8.75, No. 1 composition turnings 8.00-8.25, mixed brass turnings 6.50-6.75, new brass clippings 11.50-11.75; No. 1 brass rod turnings 7.50-7.75, light brass 5.50-5.75, heavy yellow brass 6.50-6.75, new brass rod ends 8.50-8.75, auto radiators, unsweated 6.75-7.00, cocks and faucets 7.50-7.75, brass pipe 7.75-8.00.
Lead: Heavy 8.00-8.50, battery plates 4.25-4.50, linotype and stereotype 10.50-11.00, electrotype 8.50-9.00, mixed babbitt 11.50-12.00, solder joints, 12.50-13.00.
Zinc: Old zinc 5.00-5.50, new die cast scrap 5.00-5.50, old die cast scrap 3.00-3.50.
Tin: No. 1 pewter 56.00-58.00, block tin pipe 78.00-80.00, No. 1 babbitt 43.00-45.00, siphon tops 47.00-49.00.
Aluminum: Clippings 2S 10.00-10.50, old sheets 6.50-7.00, crankcase 6.50-7.00, borings and turnings 3.50, pistons, free of struts, 6.50-7.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. Avg.	21.774	15.017	14.058	103.000	17.000	38.500	40.000	71.500
Mar. Avg.	23.486	18.825	17.056	103.00	17.00	38.50	40.00	71.50
Apr. 1-2	23.25-23.50	15.85-16.80	16.00	103.00	17.00	38.50	40.00	71.50
Apr. 4	23.25-23.50	15.80-15.85	16.00	103.00	17.00	38.50	40.00	71.50
Apr. 5	23.25-23.50	15.80-15.85	15.00	103.00	17.00	38.50	40.00	71.50
Apr. 6-13	23.25-23.50	14.80-14.85	15.00	103.00	17.00	38.50	40.00	71.50
Apr. 14-18	21.50	14.80-14.85	14.00	103.00	17.00	38.50	40.00	71.50
Apr. 19-20	21.50	14.80-14.85	13.00	103.00	17.00	38.50	40.00	71.50
Apr. 21-27	20.00	14.80-14.85	13.00	103.00	17.00	38.50	40.00	71.50
Apr. 28-30	20.00	14.80-14.85	12.50	103.00	17.00	38.50	40.00	71.50
May 2-5	18.50	14.80-14.85	12.50	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt.....	$24.00
No. 2 Heavy Melt.....	22.00†
No. 1 Busheling.....	24.00
No. 1 Bundles.....	24.00
No. 2 Bundles.....	20.00-21.00
No. 3 Bundles.....	19.00-20.00
Heavy Turnings	18.00-19.00
Machine Shop Turnings	14.50-15.50‡
Mixed Borings, Turnings	14.50-15.50‡
Short Shovel Turnings.	18.00-18.50
Cast Iron Borings.....	18.50-19.50
Bar Crops and Plate..	25.00-25.50
Low Phos. Steel.....	25.00-25.50

Cast Iron Grades†

No. 1 Cupola Cast....	23.00-23.50
No. 1 Machinery Cast.	28.00-29.00
Charging Box Cast....	25.50-26.50
Heavy Breakable Cast.	24.00-25.00
Brake Shoe	25.00-26.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-25.50
Axles	33.00-34.00
Rails, Random Lengths	28.00-29.00*
Rails, 2 ft and under.	33.00-34.00
Rails, 18 in. and under	35.00-36.00
Railroad Specialties ...	26.75-28.25
Angles, Splice Bars...	35.00-36.00

*Brokers' buying prices.
†Nominal.
‡Crushers buying prices.

CLEVELAND

Heavy Melt. Steel.....	$18.00-19.00
No. 1 Busheling.....	18.00-19.00
No. 2 Bundles.....	16.00-17.00
Machine Shop Turnings	12.00†
Mixed Borings, Turnings	17.00-17.50
Short Shovel Turnings.	17.00-17.50
Cast Iron Borings.....	17.00-17.50
Bar Crops and Plate...	22.00†
Punchings & Plate Scrap	22.00†
Cut Structurals	23.00†

Cast Iron Grades†

No. 1 Cupola	29.00-30.00
Charging Box Cast....	27.00-28.00
Stove Plate	25.00-27.00
Heavy Breakable Cast.	21.00-22.00
Unstripped Motor Blocks	21.00-22.00
Malleable	23.00-24.00
Brake Shoes	22.00-22.50
Clean Auto Cast.....	33.00-33.50
No. 1 Wheels	27.00-28.00
Burnt Cast	20.00-21.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	23.00-24.00†
Rails, 3 ft and under.	37.00-38.00
Rails, Random Lengths	30.00-32.00
Cast Steel	28.00
Railroad Specialties ..	28.00
Uncut Tires	24.00
Angles, Splice Bars ...	30.00-31.00

† Nominal.

VALLEY

Heavy Melt. Steel	$22.00†
No. 1 Bundles	22.00†
No. 2 Bundles.....	19.00†
Machine Shop Turnings	13.50-14.00†
Short Shovel Turnings.	18.00-18.50†
Cast Iron Borings	18.00-18.50†
Low Phos.	25.00-26.00†

Railroad Scrap

No. 1 R.R. Heavy Melt.	26.00-27.00

† Nominal.

MANSFIELD

Machine Shop Turnings	$13.50-14.00†
Short Shovel Turnings.	18.00-18.50†

† Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$21.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles ..	18.00
Machine Shop Turnings	10.00
Mixed Borings, Turnings	10.00
Short Shovel Turnings.	10.00
Cast Iron Borings	11.00

Cast Iron Grades

No. 1 Cupola Cast....	28.00
Charging Box Cast....	22.00
Heavy Breakable Cast.	20.00
Stove Plate	17.00
Unstripped Motor Blocks	16.00
Brake Shoes	17.00
Clean Auto Cast.....	28.00
Drop Broken Cast.....	31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	21.00
R.R. Malleable	20.00
Rails, Rerolling	25.00
Rails, Random Lengths	22.00
Rails, 18 in. and under	33.50

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 Bundles	$17.00-18.00
No. 2 Bundles	15.00-16.00
No. 2 Heavy Melt. Steel	16.00-17.00
No. 1 Busheling	16.00-17.00
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings.	12.00-13.00
Cast Iron Borings.....	13.00-14.00
Punchings & Plate Scrap	17.00-18.00

Cast Iron Grades

No. 1 Cupola Cast ..	22.00-24.00
Heavy Breakable Cast	17.00-19.00
Clean Auto Cast	22.00-24.00

BUFFALO

No. 1 Heavy Melt. Steel	$23.00-24.00
No. 2 Heavy Melt. Steel	20.00-21.00
No. 1 Bundles.....	20.50-21.00
No. 2 Bundles.....	20.00-21.00
No. 1 Bushelings.....	20.00-21.00
Machine Shop Turnings	13.00-14.00
Mixed Borings, Turnings	16.50-17.00
Cast Iron Borings.....	16.50-17.00
Short Shovel Turnings.	17.50-18.00
Low Phos.	24.50-25.50

Cast Iron Grades

Mixed Yard Cast	28.00-29.00
Heavy Breakable	26.00-27.00
Malleable	31.00-32.00
Clean Auto Cast.....	32.00-33.00

Railroad Scrap

Rails 3 ft. and under..	33.00-34.00
Scrap Rails	28.00-29.00
Specialties	29.50-30.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$22.50-23.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling.....	20.00
No. 1 Bundles.....	22.50-23.00
No. 2 Bundles.....	18.00
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings.	16.00
Bar Crop and Plate....	26.00
Punchings & Plate Scrap	26.00
Cut Structurals	25.00
Elec. Furnace Bundles.	22.50-23.00
Heavy Turnings	22.50-23.00
No. 1 Chemical Borings	Nom.

Cast Iron Grades

No. 1 Cupola Cast....	27.00
No. 1 Machinery Cast.	29.00-30.00
Charging Box Cast....	27.00-28.00
Heavy Breakable Cast.	27.00-28.00
Unstripped Motor Blocks	24.50
Clean Auto Cast.....	29.00-30.00
No. 1 Wheels.....	29.00-30.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$16.00-17.00
No. 2 Heavy Melt. Steel	14.00-14.50
No. 1 Busheling.....	14.00-14.50
No. 1 Bundles.....	16.00-17.00
No. 2 Bundles.....	14.50
No. 3 Bundles.....	nominal
Machine Shop Turnings	5.00-7.00
Mixed Borings, Turnings	5.00-6.00
Short Shovel Turnings.	8.00-9.00
Punchings & Plate Scrap	16.50-17.50
Cut Structurals	nominal
Elec. Furnace Bundles.	16.50-17.50

Cast Iron Grades

No. 1 Cupola Cast....	20.00-21.00
No. 1 Machinery	21.00-22.00
Charging Box Cast....	18.00-18.50
Heavy Breakable	18.00-18.50
Unstripped Motor Blocks	nom.
Malleable	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$15.00-16.00
No. 2 Heavy Melt. Steel	12.50-13.50
No. 1 Bundles.....	15.00-15.50
No. 1 Busheling	11.00-12.00
Machine Shop Turnings	6.00-7.00
Mixed Borings, Turnings	6.00-7.00
Short Shovel Turnings.	10.00-11.00
Bar Crops and Plate..	18.00-19.00
Punchings & Plate Scrap	18.00-19.00
Chemical Borings	12.00-13.00

Cast Iron Grades

No. 1 Cupola Cast.....	25.00-26.00
Mixed Cast	22.00-24.00
Heavy Breakable Cast.	18.00-19.00
Stove Plate	21.00-22.00
Unstripped Motor Blocks	18.00-20.00

CHICAGO

No. 1 Heavy Melt. Steel	$22.00-24.00†
No. 2 Heavy Melt. Steel	19.00-22.00
No. 1 Bundles.....	22.00-23.00
No. 2 Bundles.....	18.00-20.00
No. 3 Bundles.....	17.00-18.00*
Machine Shop Turnings	10.00-11.00
Mixed Borings, Turnings	10.00-11.00
Short Shovel Turnings.	15.00-16.00
Cast Iron Borings	12.00-13.00
Bar Crops and Plate..	23.00-24.00
Punchings	23.00-24.00
Elec. Furnace Bundles.	22.00-23.00
Heavy Turnings	20.00-21.00
Cut Structurals	23.00-24.00

Cast Iron Grades*

No. 1 Cupola Cast....	27.00-28.00
Clean Auto Cast.....	27.00-28.00
No. 1 Wheels	27.00-28.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00-24.00†
Malleable	24.00-25.00*
Rails, Rerolling	27.50-28.00
Rails, Random Length	23.00-24.00
Rails, 2 ft. and under.	28.00-29.00
Rails, 18 in. and under	29.00-30.00
Railroad Specialties ..	26.00-27.00
Angles, Splice Bars ...	26.00-27.00

* Nominal. † Allocated material.

ST. LOUIS

No. 1 Heavy Melt. Steel	$22.00-23.00
No. 2 Heavy Melt. Steel	20.00-21.00
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings.	14.00-15.00

Cast Iron Grades

No. 1 Cupola Cast ..	28.00-30.00
Charging Box Cast....	20.00-22.00
Heavy Breakable Cast.	19.00-21.00
Brake Shoes	22.00-23.00
Clean Auto Cast	31.00-32.00
Burnt Cast	22.00-23.00

Railroad Scrap

R.R. Malleable	21.00-23.00
Rails, Rerolling	27.00-28.00
Rails, Random Lengths	22.00-23.00
Rails, 3 ft. and under.	28.00-29.00
Uncut Tires	23.00-24.00
Angles, Splice Bars ..	30.00-31.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 2 Bundles.....	20.00
Long Turnings	20.00
Short Shovel Turnings.	19.00
Cast Iron Borings.....	18.00
Bar Crops and Plate..	25.00-26.00
Cut Structurals	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast.....	33.00-34.00
Stove Plate	30.00-31.00
No. 1 Wheels.....	30.00-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	24.00
R.R. Malleable	nominal
Rails, Rerolling	30.00-32.00
Rails, 3 ft. and under.	31.00-32.00
Angles and Splice Bars	31.00-32.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles....	16.00
Machine Shop Turnings	12.00

Cast Iron Grades

No. 1 Cupola Cast....	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Wheels	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling.....	17.50
Nos. 1 & 2 Bundles...	18.00
No. 3 Bundles.....	nom.
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Punchings & Plate Scrap	30.00
Cut Structurals	30.00

Cast Iron Grades

No. 1 Cupola Cast....	25.00-30.00
Heavy Breakable Cast.	20.00-22.00
Stove Plate	25.00
Unstripped Motor Blocks	20.00
Malleable	25.00
Brake Shoes	25.00
Clean Auto Cast.....	25.00
No. 1 Wheels.....	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable ...	22.00
Rails, Random Lengths	22.00
Angles and Splice Bars	22.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles...	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	28.00

Cast Iron Grades

No. 1 Cupola Cast....	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	26.00

HAMILTON, ONT.

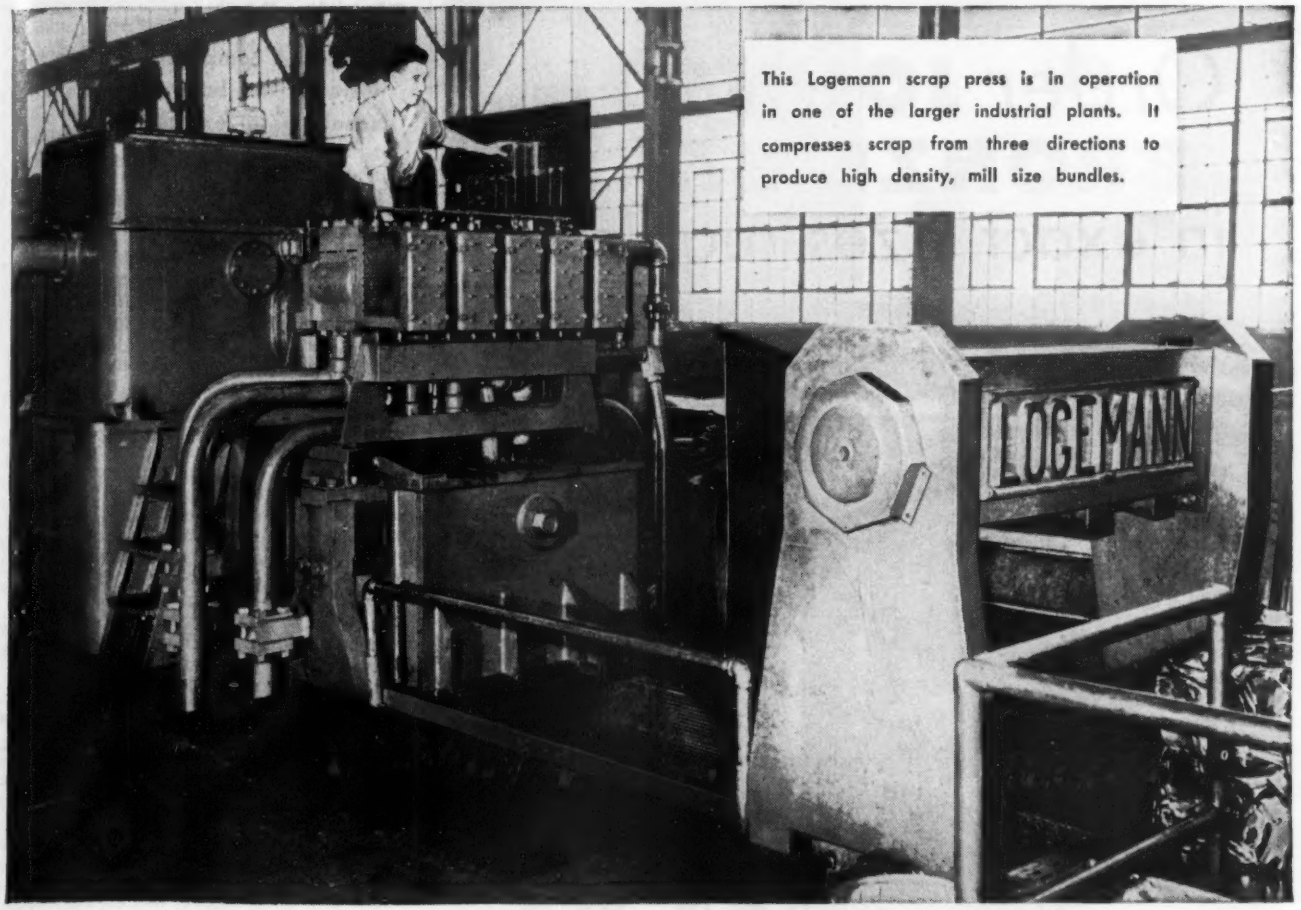
(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles.....	23.00
Mechanical Bundles....	21.00
Mixed Steel Scrap.....	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings..	17.00

Cast Iron Grades*

No. 1 Cast.....	48.00
No. 2 Cast.....	44.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-contained.....
Triple Compression..
Automatically Controlled

LOGEMANN SCRAP PRESSES

handle high tonnages with minimum labor . . . at low cost!

LOGEMANN METAL BALERS

. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information—please state the nature of your scrap and tonnage.

LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street • Milwaukee 10, Wisconsin

Order **JOHNSON BRONZE BARS** *in exact sizes required*

EVERY bar of Johnson Universal Bronze is completely machined . . . inside diameter . . . outside diameter . . . and ends. This saves you machining and tools, and guards against possible under-surface defects. Every bar is usable from end to end. Further, you buy no unnecessary weight . . . another saving. Johnson Universal Bronze is a high quality, general purpose bearing alloy cast in bar form. It is economical to use . . . easy to machine . . . and will give long, efficient service. Order from your local Johnson Bronze distributor . . . or from a factory branch near you.

Johnson Bronze
SLEEVE BEARING HEADQUARTERS
550 SOUTH MILL STREET · NEW CASTLE, PA.

Sheets, Strip . . .

Increased competition forces revisions in base prices and schedules of extras

Sheet Prices, Page 152

Pittsburgh — Jones & Laughlin Steel Corp. on May 1 adjusted downward its hot-rolled sheet extra schedules to conform with lowest competitive levels quoted by Carnegie-Illinois Steel Corp. These adjustments involved reductions in size, cutting and other extras. Company also put through some minor adjustments on cold-rolled sheet extras involving stretcher leveling, resquaring, etc., also to levels quoted by Carnegie.

Similar slight adjustments also were made on hot and cold-rolled strip extras, the most important one relating to cold-rolled strip. In this connection the company is now classifying cold-rolled strip between the widths of 12 to 23-15/16 inches as cold-rolled sheets unless special finish or edge is specified. Previously widths under 24 inches regardless of edge or finish specification were regarded as cold-rolled strip. Wheeling Steel is not expected to revise its hot-rolled sheet extras until Carnegie's expected adjustments on extras are announced.

Increased competitive conditions have also forced reduction in cold-rolled strip base prices by some of the nonintegrated interests. Late in April Elliott Brothers Co., New Castle, Pa., reduced its price from the $4.50 per 100-pound level for 0.25 to 0.40 per cent carbon to $4 for 18 gage and lighter and $4.25 for heavier than 18 gage. Company did not revise its prices for carbon specifications above 0.40 per cent.

Youngstown Sheet & Tube Co. revised its hot and cold-rolled sheets and hot rolled strip extras to competitive levels effective May 2; Armco on hot and cold-rolled sheets, hot-rolled strip and enameling sheets, effective May 4.

Continued easing in silicon sheet demand has forced Allegheny Ludlum Steel Corp. to take off two additional open hearths at its Brackenridge, Pa., mill.

Kokomo, Ind. — Continental Steel Corp., this city, has made price reductions on major sheet products, the latest of these cuts having gone into effect May 5. Base price, f.o.b. Kokomo, for hot-rolled annealed sheets 19 gage and lighter is now $5.25 per 100 pounds; for No. 10 galvanized sheets, $4.80; for galvannealed sheets, $5.30; for No. 16 flat copper culvert sheets, $5.40. Company last week resumed production of galvanized roofing sheets.

Boston—Firm orders beyond June delivery by flat rolled consumers are down to a trickle, although books are open with mills digging for volume. Balanced supply and improved delivery, coupled with determined efforts to reduce inventories, retard third quarter bookings. Lead time schedules are threatened and for some products are being revised and shortened. While outright cancellations are subsiding, deferments of May and June tonnage continue. Backlogs are filling gaps more difficult to plug

with new volume. Delivery and cost play a more important part in new buying, but trends toward return of normal competitive conditions are complicated by factors absent in prewar years, notably f.o.b. selling with consumers paying freight charges. Tack plate buying has slumped to low point with current inventories of users large in most cases.

Philadelphia—Sheet mills continue to revise extras to a more competitive basis. Adjustments also are noted in discounts published by mills on stainless sheets.

While some consumers report continued difficulty in getting certain sheet specifications, deliveries in practically all grades, excepting galvanized and perhaps cold-rolled sheets, are fairly easy. At least consumers generally appear to be having no great difficulty placing tonnage for shipment before the end of this quarter. This is especially true if they are willing to absorb freight from some of the more distant points.

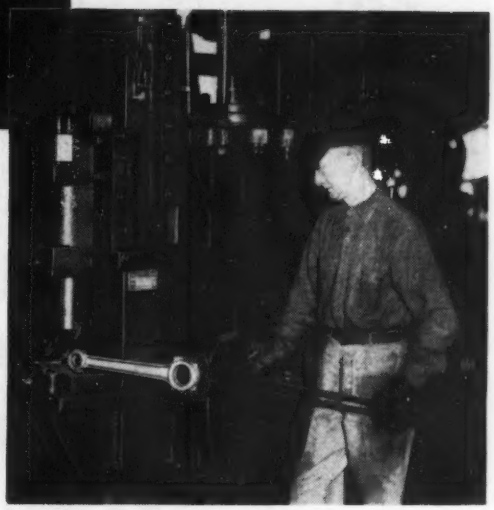
Local operations of the Philco Co. were suspended last week because of a strike.

Chicago—Leading producers have now sent out third quarter quotas, but the meaning of these customer allotments differs with individual mills, some continuing to be oversold and using the quotas as limits on the tonnage available and others hopefully regarding them as minimums and acknowledging that extra tonnage orders may be entertained as the quarter gets under way. Many sheet-using industries have not experienced the spring sales upturn they anticipated and are moving extremely cautiously in new ordering. Furthermore, a disposition to hold off buying until the last possible moment in the hope of lower prices is noted. Automotive and farm implement building companies generally are pressing for more tonnage, with many concerns in the latter group working at capacity to fill this year's strong demands. Appliance makers are now fairly well stabilized at lower production levels and are taking their reduced steel requirements on a regular basis. Electrical sheets have been most affected by these consumers' cutbacks and are available in any quantity from most mills. Lower galvanized sheet needs of many manufacturers are noted, but requirements of the building industries are taking up most of this slack.

Making 1701 tons recently placed by that office, Chicago Quartermaster purchasing, has ordered 700 tons flat steel strapping and 460,000 steel seals from Signode Steel Strapping Co., Chicago. Balance of $140,444 went to Acme Steel Co., Chicago.

Cleveland—Order books of one producer's flat-rolled products division are filled on most products through July, and one of its big customers—the automotive industry—has projected capacity operations through third quarter. Two voluntary allocations programs—warm air heating and grain bin—are continuing to take sizable quantities of hot-dipped galvanized sheets. Demand for electrical sheets is weak, most of the remaining demand from motor manufacturers being for silicon coil stock.

Cincinnati — Schedules of district



WELL KNOWN . . .
ALL OVER THE WORLD

WILLIAMS-WHITE
No. 7 Trimming Press With Outside Trimmer

- Capacity-165 T.; stroke — 6 in.; strokes per minute — 30
- Outer slide has 3 in. stroke
- Main frame — one-piece semi-steel casting
- Flywheel shaft bearings — bronze bushed
- Automatic stop, steel-jaw clutch with treadle control
- Air counter balance
- One-shot lubrication system

The press above is one of a battery of WILLIAMS-WHITE trimming presses installed at Moline Forge, Inc., Moline. The close-up at right shows a connecting rod being finished on the outside trimmer.

WILLIAMS-WHITE & CO. are pioneers in the design and construction of presses, hammers, punches, shears and rolls to meet the particular needs of industry. Each machine is truly custom built to your requirements.

If you are interested in machines similar to the one shown above or any kind of precision production machinery, write us giving as much information as possible and we will send full specifications with no obligation on your part.

MAKERS OF PRECISION PRODUCTION MACHINERY FOR NEARLY 100 YEARS

WILLIAMS-WHITE & CO.
MOLINE, ILLINOIS

COULD ANYTHING BE MORE CONVINCING THAN YOUR OWN EXPERIENCE?
Then give HERC-ALLOY the toughest chain job in your plant. Our asking for this test reflects the confidence given us by HERC-ALLOY service records from industry's leading plants.
HERC-ALLOY
STEEL CHAIN

HERC-ALLOY is America's *first* and *safest* steel chain. For slings or other applications HERC-ALLOY Steel Chain will prove efficiency, safety and economy can go hand-in-hand.

COLUMBUS McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO
Other Factories at Angola, New York, St. Catharines, Ontario and Johannesburg, S. A.

sheet mills are filled for the second quarter, with demand evidently good for carbon steel. Easiness, however, exists in some of the specialties. Outlook for third and fourth quarters is clouded by hesitation of customers to specify needs other than those for near requirements.

Birmingham—Even though Tennessee Coal, Iron & Railroad Co. is producing an estimated 10 to 15 per cent additional tonnage in sheets, order books remain well filled approximately a quarter ahead, in line with the company's established policy. Sheet business is described as "consistent and in large volume." Strip is in moderate volume with most of the product being stored, especially cotton ties.

St. Louis—Sheet demand continues unexpectedly firm. Reduction in the number of "hold" instructions on sheet orders suggests some of the apprehension over the midwest outlook for heavy industrial products may be vanishing.

Los Angeles—Sheet supplies offered by eastern sources continue to increase, and the pressure apparently is off both hot and cold-rolled material in this district. Light gage galvanized, however, remains fairly tight. Producers have opened their books for third quarter, with spot tonnages remaining open in June for some products.

San Francisco—Continued slackening of operations by smaller fabricators, coupled with universal tendency by buy cautiously, has brought further easing in demand for flat-rolled items. Supply-demand factors steadily are moving toward parity.

Sweet's Steel Revises Prices

Williamsport, Pa.—Sweet's Steel Co. has reduced its prices on rail steel bars to 4.00c mill and on rail steel reinforcing bars to 3.85c. This producer has also reduced light rail steel to $3.55 per hundred pounds, Williamsport, and fence posts to $120 per net ton.

Bethlehem Pacific Cuts Prices

San Francisco—Bethlehem Pacific Coast Steel Corp., this city, has reduced its South San Francisco mill base price on standard structurals from $4.30 per 100 lb to $3.80. The delivered cost of structurals on the new price basis is $3.87 at San Francisco.

The company also reduced its Los Angeles mill base price on hot-rolled bars from $4.10 to $4.05. The base on bars at its South San Francisco mill remained at $4.10, making the delivered cost at San Francisco from that mill $4.1592 compared with the delivered cost of $4.1324 on Fontana and Columbia bars delivered to San Francisco.

Bethlehem's price adjustments involve no freight absorption. Price changes were made to bring them in line with Kaiser Co. Inc.'s and Columbia Steel Co.'s competitive levels. The Fontana base on bars is $4 at mill and the delivered price at San Francisco of $4.1324 means that Fontana is absorbing 18.75 cents per 100 lb in freight charges.

Plates . . .

Plate Prices, Page 153

Philadelphia—Eastern plate mills are reducing backlogs, and are soliciting tonnage actively in an effort to sustain good operations over the remainder of this quarter. At least one, if not two mills, insofar as ingot operations are concerned, will likely show a substantial drop for the quarter, as compared with the first quarter. An easing in operations in other directions probably will develop in one degree or another, on the basis of the present business outlook. Under the circumstances, continued government restrictions on the exportation of plates is not setting well with producers, and there is question as to whether there will be any relief before at least next quarter. There has been an easing in restrictions on a number of steel products, but not on plates.

Labor disturbances at one large district shipyard are tending to emphasize slackness in shipbuilding requirements along the eastern seaboard, where no new construction is in prospect and where repairs have been holding at a decidedly low level.

Production at the Sun Shipbuilding & Dry Dock Co., Chester, Pa., returned to normal May 4, as workers ended an 8-day work stoppage.

New York—Except for a substantial reduction by the Harrisburg, Pa., producer, effective May 2, eastern plate prices are unchanged, at least for the moment. The reduction at Harrisburg, the second in recent weeks, brings the price at that point down to 3.95c mill.

Eastern producers are still turning out plates at a rate faster than new orders are being received. This accounts for the fact that they still have capacity available for June shipment.

Boston—Extent of the decline in plate demand, accompanied by cancellations and deferments, was unforeseen just a short time ago. From its position as one of the tightest steel products a few weeks back, the picture has changed so radically that some plate mill schedules for the second quarter are barely filled with orders beyond lagging. Backlogs have shriveled under a double-barreled blast consisting of sharp reductions in voluntary allocations and deep cutbacks in premium tonnage. Warehouses, which were pressing for tonnage until recently, are cutting back for balance. Floor plates and high tensile low-alloy are also slower.

Pittsburgh—Effective May 1, Jones & Laughlin reduced carbon plate prices $4 per ton to competitive level of $3.40 per 100 pounds quoted by Carnegie. Plate demand shows continued signs of easing, but still remains the tightest of all steel products. Sharp reduction in plate allocation for the railroad freight car program has affected operating schedules somewhat, but demand from other sources partially offsets this.

Birmingham — Plates made available by slackened car production and softening demand from some other quarters are quickly grabbed up. In general, there is no change locally in steel demand from the picture a few

30 YEARS of Continuous Experience in The Production of

Metal pouring from one of the 1000-pound Induction Furnaces.

Chemical Laboratory and Balance Room in the modern Laboratory Building completed in 1948.

HEAT—CORROSION—ABRASION—RESISTANT

ALLOY CASTINGS

Producing alloy castings for so many years for a host of important industrials has given Michiana a file of performance data and practical experience invaluable to every user of alloy castings.

LONGER HOURS OF SERVICE

Michiana experience assures definite performance results—long hours of service. From the laboratory, through the hands of experienced foundrymen to final inspection, the alloy castings made for you are under the supervision and control of an able staff of metallurgists.

MICHIANA PRODUCTS CORPORATION

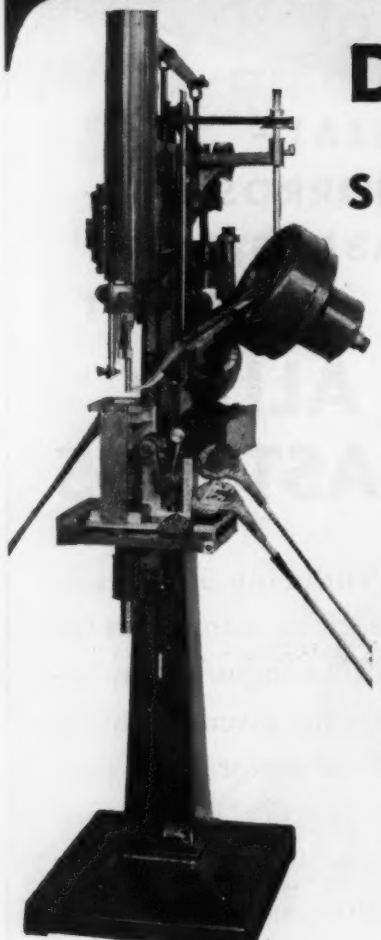
Michigan City, Indiana

MP CORP.

PRODUCTION *Increased TEN-FOLD*

with

DETROIT *—Power—* SCREWDRIVERS

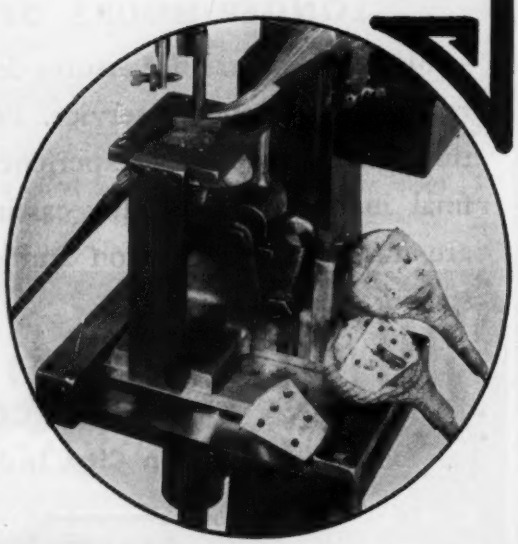


Here is a unique example of the diversified jobs done with amazing speed and ease of operation.

ASSEMBLY OF SOLE PLATES ON GOLF CLUB HEADS

Old Production by Hand, 20 to 25 Assemblies per hour—Possible production with Detroit Power Screwdrivers, 200 to 250 Assemblies per Hour.

The entire club is placed in fixture with Sole plate.—Complete Assembly is locked into place by fast cam action lock—Entire fixture rolling on ball bearing casters.—Indexed by hand to five-hole locations.—Positive positioning made possible by center-locating pin—Screws all driven uniformly without marring heads or stripping.



DETROIT POWER SCREWDRIVER CO. 2811 W. Fort Street DETROIT 16, MICHIGAN

months ago, as far as the overall situation is concerned.

San Francisco—Plates remain in short supply and, although some spotty slackening in demand is shown, the overall position remains "critical." Suppliers can foresee no chance of meeting all needs for many months.

Seattle — Plate fabricators are facing increased competition. Materials are much easier, no gray market operators being in evidence. Backlogs are fair, mostly in jobs of less than 100 tons each. Several planned industrial projects in this area will require considerable tonnage.

Tubular Goods . . .

Several producers lower galvanized pipe prices to reflect lower zinc costs

Tubular Goods Prices, Page 153

Pittsburgh—Galvanized steel pipe prices have been reduced $1 per ton (one-half point higher discount) to reflect latest half-cent reduction in zinc prices. This action was taken by National Tube and Jones & Laughlin on Apr. 29, Spang Chalfant on Apr. 30. Wheeling Steel also reduced its galvanized pipe prices last week. Fretz Moon Co. and Pittsburgh Tube Co. have not announced lower price adjustments to date. There is some prospect the former company will not take such action because of the negligible reduction in cost for size ranges ⅛ through ⅜-inch resulting from half-cent decline in zinc.

Burlington, N. J.—United States Pipe & Foundry Co. reduced its selling prices on cast iron pipe and fittings $4 per net ton, effective May 1. This reduction is occasioned by a decline in pig iron prices, the company said, and follows a reduction in general selling prices of $7 per net ton announced on Apr. 25.

Cleveland—Fear of a coal miners' strike that might interrupt steel production is believed by one producer to be helping sustain demand for merchant pipe. Although jobbers and plumbers have improved inventories of pipe, they do not regard them as sufficient to last over a period of production interruption. Even though some cancellations and hold-ups have been received on orders, the producer still finds it nesessary to keep its pipe production at capacity levels.

Los Angeles—Although pipe and tube are in good supply, even in some of the heavier categories, requirements of the oil industry are increasing noticeably. Fabricators of oil country equipment report better demand. Gasoline sales are running above last year, and construction of steel service stations is being maintained at fairly substantial levels. Standard Oil Co. of California is adding new equipment and refinery facilities to its El Segundo plant in a $500,000 expansion program. Pacific States Cast Iron Pipe Co. has opened its new $3,500,000 centrifugal casting plant at Provo, Utah. New plant will quadruple the firm's production to 400,000 tons of centrifugally cast pipe annually, and enable manufacture in a wider range of sizes.

NAX Steel Prices Cut $2

Detroit—Great Lakes Steel Corp., this city, has reduced its base prices for hot and cold-rolled NAX high-tensile steel $2 per ton to the basis of 5.15c per pound for hot-rolled sheet and strip and 6.25c for cold-rolled sheet and strip. At the same time, the company adjusted its schedule of extras in effect since Oct. 1, 1948, the schedule now in effect for NAX steel being the same as that applying to hot-rolled and cold-rolled carbon sheet and strip.

The reduction effects the same differential over mill prices on competing types of high-tensile steel that exists on carbon steels, namely $4 per ton. NAX base prices had been $6 a ton higher than other sources on this grade of steel.

Head of Blair Strip Steel Dies

New Castle, Pa.—George D. Blair Jr., president and founder of the Blair Strip Steel Co., this city, died last week. Funeral services were held May 6.

Steel Bars . . .

Bar Prices, Page 152

New York—Most bar sellers still have tonnage available for delivery in the second quarter—not only alloys and specialties, but hot and cold-drawn carbon bars as well. Producers believe they will be able to maintain a good rate of operations throughout May and June as they expect to obtain the new tonnage necessary. All are active in building up third quarter backlogs as much as possible and are making no effort to set up consumer quotas as heretofore. In other words, there is no occasion for allocation.

Boston—Discounts to distributors are being restored to 10 per cent on stainless by some producers; an exception is strip which remains at 5 per cent which also applies to direct shipments. Distributors for some time have been complaining 5 per cent leaves too narrow margins. Alloy demand is slow and few consumers of carbon bars have placed orders beyond June while district quotas, with consumer allocations out, are more difficult to move. Where difference in delivered cost of bars is confined to around $1 per ton, consumers are not too concerned with supply source, but some shifts have resulted where the cost spread is greater.

Philadelphia—While overall volume continues to decline, hot carbon bar demand continues diversified, with trading still fairly active. Producers, however, are having to scratch for tonnage in order to keep mill schedules at a reasonably good level. They are accepting business for third quarter without any attempt at setting up consumer quotas. Sellers of cold-drawn bars are continuing to accept orders for shipment over the remainder of the year.

Pittsburgh—Carbon steel bar sellers contend production schedules are intact through remainder of this quarter, while bookings for early

HOW YOU SAVE,
Getting Drier Compressed Air

● Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

Write for complete information; ask for Bulletin No. 98

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. S, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

third quarter have failed to record to date the expected improvement. Apparently customers are still in the process of reducing inventories to more realistic levels based on curtailed production schedules. Cold-finished bar producers note little change in the tempo of new demand and add that mill deliveries, while somewhat easier, are still well extended for most hot-rolled bar classifications.

Birmingham—Bar demand is steady. Mill sources are still swamped with demand for concrete reinforcing and some increase is noted in merchant needs. Backlogs are in line with the established policy of booking approximately a quarter ahead.

Structural Shapes . . .

Structural Shape Prices, Page 153

New York—Structural awards are light, although two or three fairly sizable jobs, including a 9100-ton bus terminal for the Port Authority, are expected to be placed momentarily. Moreover, bids are now being asked on several public projects, including a bridge across the Hudson at Mechanicsville, N. Y., on which bids will be closed May 25. Incidentally, plans for major alteration work on the Brooklyn bridge, estimated to cost around $5 million, will soon be ready for action.

Shape deliveries are now relatively easy as compared with a few months ago, with some mills now offering shipments against new orders in four to five weeks. Fabricators are making inroads into backlogs, although most, particularly the larger ones, still have considerable work on their books.

Boston—Deliveries on plain structural material for fabrication have improved to the extent weekly rolling schedules are possible in one case with June open in other mills. Buying largely for specific projects, shops are not stocking structurals to any extent and are depending less on warehouses for fill-in requirements, costs being a factor with fabricated steel quoted at lower levels. Deliveries have improved with larger shops, to four months from five in one case. Inquiry is featured by 1000 tons, engine overhaul plant, Quonset Point, R. I.

Massachusetts is buying more bridges direct, fabricated and delivered, following Maine and New Hampshire in this respect.

Philadelphia—Featuring the local structural market is the recent opening on 15,000 tons of shapes and 1200 tons of reinforcing bars for the state bridge on Penrose Ave., this city, with the Bethlehem Steel Co. low bidder.

Chicago—State highway departments are soliciting bids on a number of paving and bridge jobs, Illinois now inquiring on 11 paving projects and five bridges and Iowa also putting several bridge jobs out for bids. Leading shape inquiry reported last week was for 4000 tons to be used in a manufacturing plant of American Can Co. at Milwaukee.

Los Angeles—Demand for structurals is off while supplies of both local and eastern material are plentiful. Wide flange beams, until recently a tight item, now are available in more than adequate tonnages. Fabricators of steel buildings report their business holding up fairly well. One leading constructor has a 30 day backlog, compared with its 60 to 90 day backlog last year.

San Francisco—Supplies of structural items are increasing, as shipments into this area rise and demand fails to come up to previous levels. Heavy construction continues to lag. Pending projects for later months this year indicate there will be no major upswing.

Seattle — Fabricators report normal operations and fair backlogs. Supply of structural shapes, including wide flange shapes is much easier. Considerable tonnage is pending for Alaskan projects. Inquiry for small jobs has declined, but the overall prospect is fair.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Seattle—Rolling mills are booking new tonnages, mostly in less than 100-ton lots, equalling production volume. Backlogs are about stationary and present indications are that plants will be at peak operations until the end of 1949. Demand for merchant bars has declined somewhat, but reinforcing continues very active, both from public works and private construction.

"LOGAN" SINCE 1916...recognized throughout the industrial world as the mark of dependability in Fluid Power.

★ **PLANT CAPACITY**—A fully equipped, modern plant with a floor space of 100,000 square feet.

★ **MANUFACTURING KNOW-HOW**—The men who actually build the Logan products have an average of 10 years' experience with the company.

★ **LOGAN PRODUCTS**—Chucks, Cylinders, Valves, Presses, Sure-Flow Coolant Pumps in both standard and special air and hydraulic equipment.

★ **ENGINEERING SERVICE**—A staff of competent engineers is available, without charge or obligation, to help you solve your production power problems.

FREE CATALOGS
Advise us of your requirements. Our catalog covering such equipment will be mailed promptly.

LOGAN
Air and Hydraulic Equipment
Saves Time, Effort, Motion

LOGANSPORT MACHINE CO., INC.
817 Center Ave., Logansport, Ind.

FLUID POWER SPECIALISTS SINCE 1916

Alloy Steel . . .

Cleveland—Demand for alloy steel is down far below what it should be in relation to the demand for carbon steel. This leads producers to believe consumers are utilizing inventories and will have to come back into the alloy market during the summer if the demand for carbon steel does not fall appreciably below present levels. However, alloy demand is not expected to rebound to the high point of late last year, inasmuch as part of that demand came from the use of alloy steels as substitutes for carbon steel, the availability of which has improved.

Wire . . .

Wire Prices, Page 153

Pittsburgh — Jobbers' stocks of nails and fence remain restricted due to continued heavy demand, while the reverse is true for barbed wire in growing number of instances. Downtrend in demand for manufacturers' wire items has been more pronounced than for merchant trade products. Despite extensive efforts to reduce inventories of furniture spring wire, manufacturers continue to report excessive stocks primarily due to sharp decline in their operations. Demand for manufacturers' wire from automotive concerns is holding up well, but reverse is true for cold-heading stock and other rod and wire requirements from producers of nuts and bolts. Wire prices among various producers here are all on competitive levels. Despite reports of freight equalization among producers in other areas, sellers here claim to be adhering strictly to mill pricing policy.

Chicago—Jobbers report the spring buying rush on fencing, steel posts and nails is rapidly exhausting their already low stocks, but that poultry netting, barbed wire and bale ties are in ample supply. Manufacturing demands continue restricted in most directions and greater competition for available business has caused one nearby producer to adopt quotations of major Chicago, Birmingham and Pittsburgh interests as its prices in those territories, while officially retaining a somewhat higher f.o.b. mill price on other sales.

Birmingham—Total wire demand is well maintained and, even in nails, the supply situation is not even approaching an excess. Barbed wire demand has fallen off considerably, a seasonal condition, in favor of wire fencing which has reached almost the clamor stage. Production is described by mill sources as at virtual capacity.

San Francisco—Supplies of wire are ample to meet present demand. Some pick-up in agricultural buyers has not been sufficient to change the picture materially.

Tin Plate . . .

Tin Plate Prices, Page 153

Pittsburgh — Seasonal food pack and general line can requirements are expected to sustain full tin plate operations through most of third quarter. Few trade authorities are optimistic, however, as to demand prospects in final three months of this year. In recent years, the decline in perishable food pack program was more than offset by demand for general line containers. It is questionable to what extent this pattern will be followed in 1949 in light of reported easing in demand from some sources due to inventory situation. Belief that tin plate prices will be downward rather than up for 1950 (perhaps sooner) is an additional factor likely to retard rather than to stimulate buying in closing months this year as contrasted with situation in preceding years.

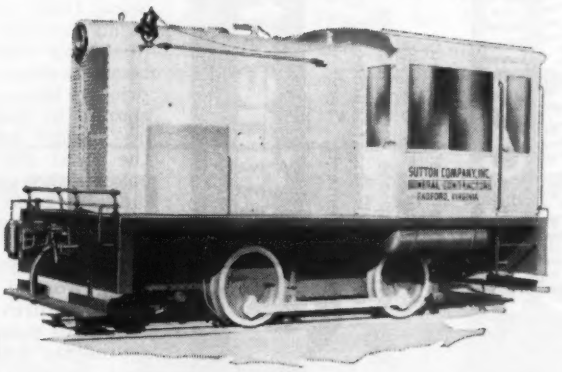
Export Price List Revised

New York—Reflecting reduction in price of zinc, United States Steel Export Co., U. S. Steel subsidiary, has announced the following new export prices, effective as of Apr. 29, on carlots with freight included to New York, Philadelphia or Baltimore.

	Per Cent off List
American Standard Pipe, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	25.1
Seamless, 3½ to 6 in., galvanized..	17.6
English Gas Tubes, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	27

Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

If Your Operation Calls for RAILS



DAVENPORT LOCOMOTIVES — Speed all over the World

DAVENPORT Better-Built LOCOMOTIVES are AVAILABLE in STEAM GASOLINE DIESEL with ELECTRIC or MECHANICAL DRIVE

• COMPLETE INFORMATION ON REQUEST

Wisdom calls for DAVENPORTS

A Davenport Better-Built Locomotive will give you flexible, always available, haulage power for record work accomplishment at lowest ton-mile costs. Whatever the size and type you require, a Davenport will put Profit-Power on your rails.

WE ANALYZE YOUR NEEDS

It will be a pleasure to send you our latest Haulage Survey Data Sheet to enable you to describe your haulage conditions accurately and completely. Our engineers will analyze the data you submit and recommend the power unit that will perform most profitably for you.

EXPORT OFFICE

BROWN & SITES CO., INC.

50 Church St. New York 7

Cable Address "BROSITES"

DAVENPORT LOCOMOTIVE WORKS

A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA

Check First with Continental for
STEEL CASTINGS 50 LBS. to 250,000 LBS.

For any size steel castings . . . for intricate, difficult castings . . . for unusual castings that require experienced "know-how" . . . Look to CONTINENTAL. Three large and complete foundries are at your service with extensive foundry, heat treating and machining facilities to give you early delivery on your toughest casting requirements. Send your prints for quotation.

Continental FOUNDRY & MACHINE CO.
CHICAGO · PITTSBURGH
Plants at: East Chicago, Ind.; Wheeling, W. Va.; Pittsburgh, Pa.

Pig Iron . . .

Split market develops in southern market as two producers cut prices $4

Pig Iron Prices, Page 154

Birmingham—A split market has developed in the pig iron market here. Woodward Iron Co. reduced prices $4 a ton on Apr. 28 while Sloss-Sheffield Steel & Iron Co. subsequently made a like reduction. Up to late last week, Republic Steel Corp. had made no revision in prices, making the market here quotable at $38.88 to $42.88 for basic and $39.38 to $43.38 for No. 2 foundry.

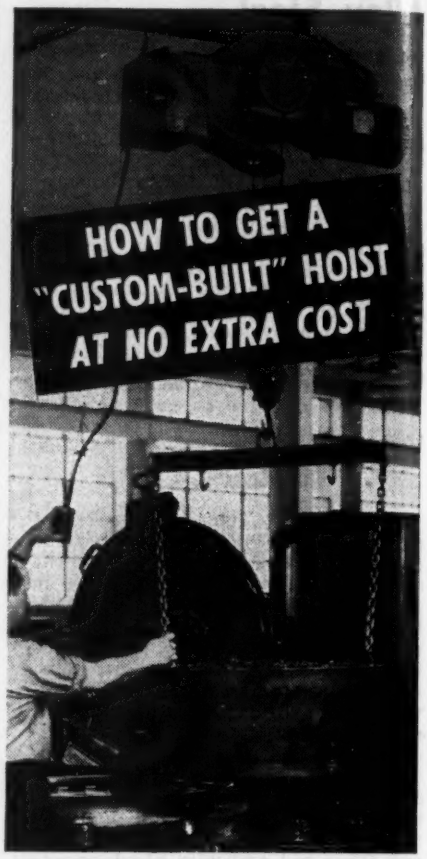
Pig iron demand is smaller than it has been for a year or more, but not so much so that a preponderance of the merchant melt is not easily accounted for. Merchant melters anticipate a measurable pickup in June.

New York—The new month has started off slowly in pig iron, with buying still spotty and sellers looking for little improvement in May. Some trade leaders believe that the trend actually will be off from the preceding month. While there has been a drop in southern pig iron prices, there has been no recent change in eastern quotations. Also no change has been announced by the local district producer of oven coke, although reductions have been made by oven coke producers in both the New England and Philadelphia districts.

Boston—Inventories of castings are being worked down slowly, but with slight improvement in shop melts. Tonnage now going out, however, represents firm orders, for the most part booked since the decline. An excess of iron is available with more furnaces stockpiling. High cost foreign iron is still a factor in inventories and distribution of this iron is on wider scale than indicated by original purchases, some of which were distributed among smaller shops. Price spreads on domestic iron have narrowed; Buffalo is now $2.69, Boston, higher than Mystic and Eastern Pennsylvania around $2.35. Reduction of $4 per ton furnace for southern iron makes that tonnage competitive at heavier consuming points in this area. Draper Corp., Hopedale, Mass., is closing its Framingham branch shop in September.

Philadelphia—Pig iron producers, catering to the merchant trade, are continuing to pile tonnage and in general look for even lighter shipments this month than in April. In fact, they see little real improvement ahead for some weeks to come. The $4 reduction has given southern producers a price advantage over some producers on business in the Baltimore area and has also given them an advantage on certain points in New England. Except on large tonnages for Delaware river pipe foundries, taking combination rail and water rates, southern furnaces appear to have no advantage in the Philadelphia district.

Pittsburgh—Reductions of $4 per ton in merchant foundry iron by a Southern producer has prompted some major consumers in this district to anticipate similar action by Pittsburgh Coke & Chemical Co.



At no extra engineering cost, you can have a Reading Electric Hoist that's CUSTOM-BUILT to solve your special materials handling problems.

The Reading Unit Construction Plan gives you a choice of several standard interchangeable mechanisms. With this plan you can select the type of suspension, control, hoisting and motor unit that best suits your job requirements. Imagine the advantages you get in a hoist "tailor made" to your own specifications! If your operating conditions change, you can modernize—and save costs—by simply changing one or two units.

See your distributor for more information on Reading's Unit Construction Plan or write us today for your copy of "144 Answers To Your Hoisting Problems."

READING CHAIN & BLOCK CORPORATION
2102 ADAMS ST., READING, PA.
CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

However, by late last week end such price action had not materialized. Drying up of demand for merchant iron has made it possible for this interest to begin building up stocks for the first time in years. Many foundries, notably among the small jobbing concerns, are either shut down or operating on 3 to 4-day production schedules. Most enamelware companies have top-heavy inventories which are not being reduced as fast as hoped for for this season of year.

Jones & Laughlin Steel Corp. blew out its No. 1 blast furnace at Aliquippa for relining on May 2, leaving 44 out of 47 furnaces pouring iron in this district.

Cleveland—With demand for pig iron below production capacities, producers are building the first stockpiles they have had since before the war. Instead of putting all the surplus into stockpiles, one producer is diverting part of its surplus furnace capacity into production of hot metal for its open hearths.

Foundry order backlogs continue to dwindle and some shops are adjusting operations to lower levels. One shop which had been running two days a week will skip operations one week and operate four days the next week.

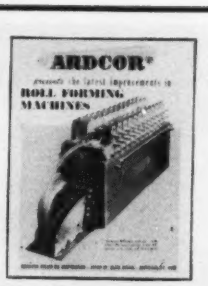
As operations continue downward, foundries are further reducing their stocks of iron and scrap. There is some belief the decline in demand for iron will halt as soon as foundries have completed their reduction of iron inventories and find it necessary to buy for current operations.

Buffalo—With demand continuing spotty, volume of pig iron moving into local merchant iron consuming channels during May will fall short of last month's total. Producers will avoid piling iron, however, as an increased amount of iron is moving out of the area, especially to Michigan motor casters.

Pig iron operations slipped six points when the Tonawanda Iron Division of American Radiator & Standard Sanitary shut down its stack for an extensive rehabilitation job. The furnace will be down for about two months.

Cincinnati—An expected upturn in the foundry melt in this district has not yet developed, so that operating rates continue an average of three or four days a week. Lowered prices on southern iron might spur demand for castings, but until the melt is heavier the ordering of iron is not likely to be expanded. Foundries seek to hold inventories at an extremely low level.

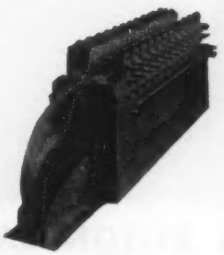
Chicago—Much speculation as to what price action might be taken on merchant iron was heard in the local foundry trade last week as the result of softened demand but the present structure probably will hold until outcome of wage negotiations in allied industries is known. Feeling is prevalent that high-priced iron inventories have pretty well been worked off and a more regular flow of orders can be expected. Operations of many job shops continue restricted to about three days a week; a few are taking vacations. Captive shops generally are operating at satisfactory rates and these sustain the level of the district's total melt.



WRITE
For Your COPY TODAY!

ARDCOR* ROLL FORMING MACHINES
* Formerly McKinney—
WITH ARDCOR IMPROVEMENTS

FORM, EMBOSS and CUT *all* in One Continuous Operation!



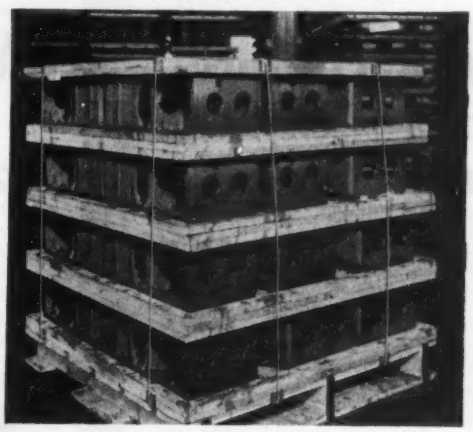
USE ARDCOR ROLLER DIES!

Continuous precision and quality of cold rolled products depends upon your roller dies! With correctly designed ARDCOR Roller Dies (For All Roll Forming Machines), made of highest grade tool steel, maximum production speeds are assured . . . better products obtained.

Send Work Specifications For Estimates . . . No Obligation.

AMERICAN ROLLER DIE CORP.
20700 St. Clair Ave. ★ CLEVELAND 17, OHIO

Transmission cases securely bound to pallet with Gerrard 10 gauge Round Steel Straps. (Photo by International Harvester Co., Industrial Power Division.)



The "Strapping Twist" that saves time and money— GERRARD

The use of Gerrard Round Steel Strapping will cut your material costs 30 to 50 percent.

The simplicity of Gerrard Steel Strapping operations will speed up binding and packaging procedures. Every Gerrard machine tensions the strapping, forms its own twisted seal, trimmed smooth with no exposed ends.

And the Gerrard method gives unrivalled protection. Packages are securely bound into rigid, pilferproof bundles. In crates, cartons, palletized loads, and carload lots of steel pipe, sheets and machinery, torsional sway is practically eliminated and damage claims are sharply reduced.

Gerrard Round Steel Straps come in a wide range of gauges to satisfy every commercial and industrial need. Gerrard Engineers will gladly help you solve your packaging problems. Their services are available *free of charge.* Write for our free books, *Blue Book of Packaging* and *Red Book of Carload Stowage.*

GERRARD STEEL STRAPPING COMPANY
(Formerly The Gerrard Company, Inc.)
4745 So. Richmond St., Chicago

USS UNITED STATES STEEL

A 21-TON CASTING
COULD BE A WHITE ELEPHANT

It takes considerable gumption to design a 20-ft. grinder bed. Many things could go wrong in casting such a monster. But the designer of this bed had confidence in our ability to cast it without distortion and structural defects—and that's what we did.

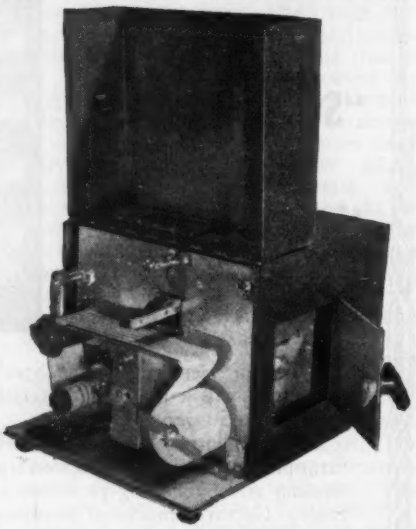
In many instances, ADVANCE CASTINGS are shipped considerable distances because our customers have found that it pays to go far for dependable foundry work. The cost of transportation—in fact, the entire cost of a casting—is insignificant compared to the extra machining costs which would be incurred in working up a casting that developed blow-holes, hard spots, sponginess, etc.

The character of our castings became widely known through *Strenes Metal* cast dies. We employ the same techniques in custom foundry work. If you want the evidence, write or phone us.

ADVANCE CASTINGS
THE ADVANCE FOUNDRY CO.
DAYTON 3, OHIO

STRENES METAL • ALLOY GRAY IRON • GRAY IRON

A RECORDING MECHANICAL COUNTER
That Meets All Industrial Requirements



Operates on the output of a photo-electric cell, limit switch or any similar device. Records production against time and maintains a permanent record on a 2¼" tape. Automatically resets to zero every hour.

Here is a step in production counting that permits a complete analysis of efficiency in terms of hours or minutes instead of shifts, days or weeks. The reset feature eliminates much computation. It simplifies the entire task of studying production flow and determining how to maintain a high production level.

WRITE FOR BULLETIN B.

STREETER-AMET COMPANY
Automatic Weight Recorders & Scales
HIGH SPEED COUNTERS SINCE 1888
4103 RAVENSWOOD AVENUE, CHICAGO 13, ILL.
STREETER-AMET

Scrap . . .

Undertone continues weak on increased offerings of distress industrial scrap

Scrap Prices, Page 158

Pittsburgh—A few cars of distress No. 1 heavy melting industrial scrap was reported purchased last week at $23, without confirmation. This tonnage is not considered significant enough to establish a $1 lower price level for the grade, although based on rumored offerings, it would not be surprising that the next representative purchase will be at the $23 level. Considerable tonnage of industrial scrap continues to be returned to mills at published quotations. However, there is increasing tonnage of distress industrial scrap that is being offered at lower prices.

A sale of low phos was confirmed last week at the level of $25, off 50 cents from the lower side of the price range.

Prices for cast grades remain largely nominal, although recent offerings of mixed cupola cast and machinery grades have been made at $2 below previous quotations.

The B. & O. awarded some No. 1 heavy melting scrap in the Valley area around $26. Prices for this grade here are unchanged at $25 to $25.50 in absence of any sale. B. & O. awarded railroad specialties to consumers here within price range of $26.75 to $28.25. Other railroad items continue unchanged in the absence of any sale. A representative tonnage sale of short shoveling turnings at $18.50 reaffirms previously quoted price.

New York—Scrap brokers' buying prices are unchanged except for a further easing in mixed borings and turnings for which they are now offering $5-$6 fob shipping point. Consuming demand continues dull, with railroad and industrial scrap about all that is moving.

Boston—Steelmaking scrap slid off again, from 50 cents to $2 per ton, depending on classification, with turnings dipping the most. No. 1 heavy melting steel declined to $15, shipping point, and No. 2 to $12.50. Cast scrap prices are also weak and buying of all grades is light. Yards are curtailing take of light iron which has eased to $6 a ton. Meanwhile melters operate on scrap which cost up to three times current quotations, policy being to work off this tonnage first. One steelworks closed down all its open hearths last week.

Philadelphia — Prices on major open-hearth grades and on cast scrap are unchanged. In fact, there have been no changes in the major cast grades for at least three weeks, with a result that some trade leaders believe the market has reached bottom on those grades unless there are substantial reductions in district pig iron prices.

However, there is a diversion of opinion as to whether the principal open-hearth grades have reached bottom, despite the fact that there has been no change for the second consecutive week.

Recent revisions comprise declines

"MUST IT RUST?" A three billion dollar question that is dramatically answered in our 16 mm sound motion picture. This educational film is one that interests both consumer and producer—and everyone who is concerned with the problems of rust and corrosion should see it.

A print of this film will be gladly loaned—

Regarding availability of this 25-minute sound film in 16 mm size, for showing to your personnel, or to any group in your community, write, The Secretary, American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh, Pa.

hot-dip GALVANIZING

in turnings and low phos scrap. Machine shop turnings are now holding nominally at $12-$13 delivered; mixed borings and turnings, $11-$12; and short shovel turnings, $16. Bar crop and plate and plate scrap and punchings are off $1 a ton to $26 delivered.

While import shipments in general are tapering somewhat, the leading eastern consumer had six cargoes unloading last week, with other shipments on the high seas. Three cargoes of imported scrap were being unloaded here last week.

Cleveland—A somewhat increased demand for blast furnace grades of scrap pushed prices up around $1 a ton last week, with a result mixed borings and turnings, short shoveling turnings and cast iron borings were quoted at $17-$17.50, compared with $16-$17 the preceding week.

With metalworking plant operations at a reduced level, dealers reported some difficulty in procuring enough tonnage to fill orders. One plant that had been generating around 400 tons of scrap monthly now is the source of only 100 tons.

Demand for open-hearth, electric furnace and foundry grades of scrap continues weak as consumers continue to work off inventories. One consumer's need for steelmaking scrap has declined to the point where it had to ask that shipments of scrap be diverted to one of its other mills. The diverted tonnage overtaxed unloading facilities and it was necessary to have shipments delayed.

Buffalo — Dealers continue their search for buying interest in the scrap market. Despite the lack of buying, a better undertone prevailed in steelmaking grades around recently-slashed prices. Blast furnace items ran into further weakness with prices on turnings tumbling 50 cents to $1. Withdrawal of a stack and the fact that leading consumers were out of the market were leading factors.

Detroit—What happened to the large automotive scrap lists is the question brokers are asking after entering bids and receiving virtually nothing. Generally they are convinced the material was moved direct to two large mills at negotiated prices well above the current market, the ostensible purpose being to maintain "goodwill." Actually what it amounts to is an indirect reduction in price of new steel furnished the scrap sources by these mills, and it also connotes a new perception of the key position which scrap occupies as a lever for holding onto business which might slip away to competitors. Just what premium mills are offering on open-hearth scrap is not clear, but reports are heard of a little over $20 per ton, against STEEL's published price of $17-$18 for bundles, and it is difficult to justify the latter figure on the basis of any concrete sales in the open market. Dealers cannot sell at this price, since the mills refuse to buy. A tonnage of mixed borings and turnings was sold last week at $1 off the market.

Chicago—Scattered purchases of several grades of steelmaking scrap in the last 10 days had little effect on the market. They affirmed the top range of brokers' offering prices in the case of No. 2 heavy melting steel

PAGE
Stainless Steel
WIRE
ROUND
FLAT
OR
SHAPED

PAGE has been drawing stainless steel wire since the earliest development of stainless—for many manufacturers has become "Wire Headquarters."

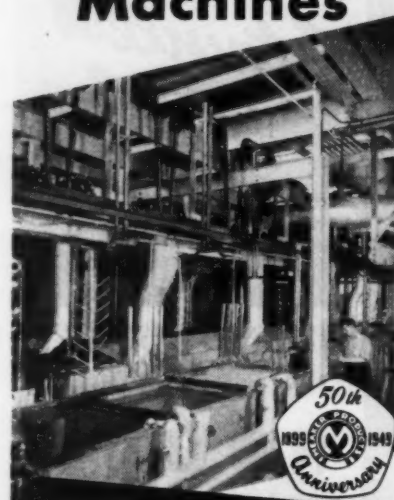
Think of PAGE as a responsible source for wire—stainless steel, high or low carbon steel. Whatever your problem involving wire . . .

Get in touch with Page!

ACCO
Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

MEAKER
Electroplating Machines

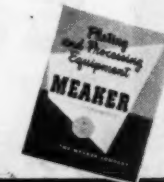


AUTOMATIC MACHINES
STRAIGHT-A-WAY and RETURN TYPE
for mass production of
large or small pieces

SEMI-AUTOMATIC MACHINES
For supplementary capacity
or medium output departments

SPECIAL MACHINES
For any special plating
or cleaning sequence

Equipment tailored to fit your requirements, making every operation in the plating sequence automatic, or as mechanized as possible, is the profitable way to handle electroplating on a production basis. This Meaker method applies equally well to departments with only moderate daily output and to the largest and heaviest plating needs of the mass production plants. It offers not only a lower unit cost, but the production is increased, and a better and more uniform quality is assured.



Write for the full information. Ask for Booklet 148

THE MEAKER COMPANY
1631 South 55th Ave., Chicago 50, Ill.
Telephone CRawford 7-7202

and No. 2 bundles, lifted the market for short shovel turnings by $1, and provided temporary optimism by the slight improvement in tonnage compared with earlier buys, but at the same time they dissolved the hopes of many in the trade that May buying would be on a more normal basis. At present, opinion is that several district mills will not be back in the market this month.

Some dealers report that covering of the latest sales is slow and yard work is stagnant in many cases. Minimum buying from scrap generators continues to be the rule with dealers, based mainly on the disposition of some mills to circumvent yards and make their limited buys from producers. Excepting for the short shovel turnings purchase, turnings grades have sunk to lower price levels in the virtually nonexistent market for them locally.

Cincinnati — Consumer buying interest in scrap continues dull. Prices of cast and railroad grades were reduced further, but less drastically than in recent weeks. Reflecting light melt, few foundries are taking in material and then in small tonnages only. Railroad scrap lists are heavy against weak demand. One district mill is holding up shipments; others are disinterested in volume commitments.

Birmingham—Scrap prices remain weak. Little buying is in evidence and, although heavy melting continues at $20, virtually every item on the list is nominal since trading is almost at zero. Truckers have virtually quit due to the drop in prices and unseasonable weather.

St. Louis—Railroad and cast scrap prices showed new weakness last week, with melting steel remaining relatively stable. Railroad offerings have been heavy as a result of better replacement deliveries. Cast continues to suffer from reduced foundry operations and easier pig iron supplies. Mill scrap inventories are comfortable and no new purchases are being made. Some brokers fear difficulty ahead in filling old orders. Country shipments are drying up and are expected to remain low the rest of the summer since collection costs sometimes are too high to justify shipping at present prices. Mill scrap buyers still profess belief further price slides are ahead.

Los Angeles— Undertone of the scrap market is a little firmer, although prices are unchanged. This may reflect lowered receipts by dealers and the drying up of collections. Very little railroad scrap is coming in, and shipbreaking is virtually at an end. Since off-shore scrap does not meet total requirements, mill stockpiles are being depleted. Meanwhile, mills have not increased their buying beyond small, selected tonnages. Although foundry activity still is in the doldrums, No 1 cupola cast is a little firmer, primarily because of dwindling supplies.

San Francisco—Prices of steelmaking grades of scrap declined $2 a ton here last week. No. 1 heavy melting is now $20 a ton; No. 2, $18; dealer bundles, $16. Machine shop turnings held unchanged at $12 while No. 1 cupola cast is unchanged at $25 to $30. Mill buyers say the new prices will bring out sufficient scrap to sustain present rate of operations and that they will buy "selectively." They look for further price softening.

Seattle—Steel scrap is steady at $22, $20 and $18 for No. 1 and No. 2 heavy melting and bundles respectively. Mills are not buying unprepared material. Receipts from the interior are less than expected, but this is attributed to spring work on the farms. Inventories are being increased slowly. Bethlehem Pacific Coast Steel Corp. has three or four full cargoes en route from Japan.

Warehouse . . .

Warehouse Prices, Page 155

Pittsburgh—Steel distributors note a definite decline in order volume, with April shipments off 30 to 50 per cent from those for the like month in 1948. Warehouse business has reverted to normal small-order specifications, with customers very inventory conscious and confident that steel will be available when needed in the future. Much of the business originating from metalworking companies that previously could not obtain their steel requirements from the mills has been on the decline in recent weeks. However, by prewar standards most distributors contend they are handling substantially more tonnage. Inventory situation at the warehouse level is in much better balance than at any time since prewar, with possible exception of heavy plates and light flange beams.

Cleveland—Business continues slow at warehouses due to reduced requirements of consumers, determined efforts to work off plant inventories, and availability of distress stocks. In connection with the latter, one warehouse has been advertising some of its stocks for sale at mill prices. With business having grown highly competitive, warehouses are watching prices closely. They find difficulty in trying to determine whether price cuts refer to regular stock or just to distress tonnage. Items still in relatively active demand at warehouses are heavy and light plates. With business at a reduced level, warehouses are cautious against becoming overstocked in any product.

Cincinnati—Stocks of district warehouses are steadily coming into better balance. Even sheets and plates are in better supply. Structural steel and beams continue scarce, even though the volume of construction orders since the return of favorable weather has been a disappointment. Jobbers are having difficulty moving odds and ends, which were gobbled up quickly when demand was at peak.

Chicago—Distributors' stocks are showing rapid improvement due to lower customer order specifications but are not fully balanced in sheets, plates, structurals or bars, a condition which may exist for some time because of the policies apparently being followed with respect to third quarter quotas by some mills. The quotas set up by some producers to warehouses seem still to provide maximum tonnages for the period, whereas quotas to consuming accounts are regarded as minimum

quantity guarantees. The quota set-up is in state of flux, as necessitated by approach of normal steel marketing procedures but major warehouses will probably not benefit immediately from the change.

St. Louis—Warehouse steel stocks last month showed the first really substantial improvement in nearly four years. Most have good assortments in the majority of items, with the exception of plates and some sections of hot-rolled bars and heavy hot-rolled sheets. Mills are making many shipments to jobbers considerably sooner than promised. Demand continues good, with spottiness developing according to the individual consumer rather than according to type of consuming industry. Buyers are playing it close to the belt and making no purchases not currently needed. Anticipatory buying of the last two or three years has faded out.

Los Angeles — Bottom seems to have been reached in warehouse activity, and new orders continue to move slightly upward. Jobbers are making strenuous efforts to balance their stocks. They are buying in good volume against needed items, and are disposing of surplus material wherever and however they can. In some cases considerable price concessions are being given to expedite the adjustment of warehouse inventories. Although demand for reinforcing bars has somewhat improved in recent weeks, a price reduction of 25 cents per 100 pounds has been announced. New warehouse base price on ⅜" rounds is $5.25 per 100 pounds, quantities of 40,000 pounds and over.

Seattle—Jobbing houses report an upturn in volume which is below the average for recent years but much greater than prewar. Supply is approaching normalcy. Stocks remain badly broken, but are being replenished as rapidly as possible. Black and galvanized sheets are easier and some stock is now being carried. The same applies to alloys, plates and reinforcing bars. Prices are steady and unchanged.

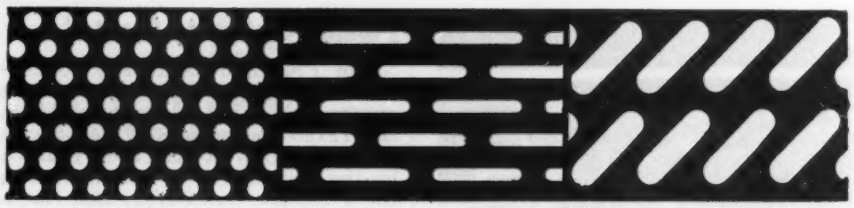
Metallurgical Coke . . .

Metallurgical Coke Prices, Page 154

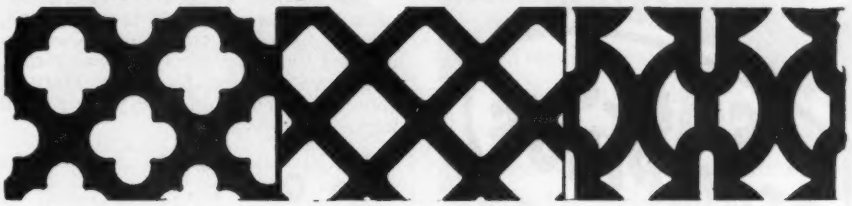
Pittsburgh — Connellsville beehive foundry coke prices weakened last week with the higher side of quoted price range declining 50 cents to $17.50 per net ton. Despite threat of coal strike, there has been continued easing in demand for foundry coke due primarily to sharp reduction in operating schedules among captive as well as jobbing foundries. No further weakness is noted for Connellsville beehive furnace coke, following recent decline of 50 cents per net ton.

Mill Equipment Demand Heavy

Pittsburgh—In contrast to rather pessimistic demand outlook for steel and number of civilian goods items over the remainder of this year, manufacturers of steel mill equipment state a high level of operations into 1950 is assured based on present order backlogs.



For Whatever Purpose You Need Perforated Metal



Hendrick will fabricate it to your specifications * * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service. Write us regarding your requirements.

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

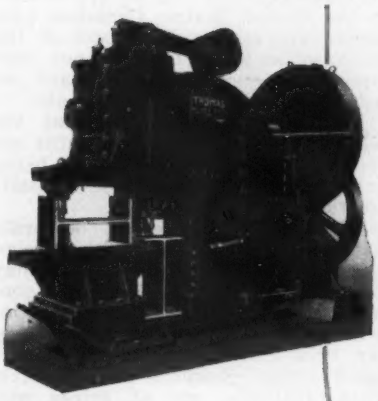
Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

30 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

BEAM PUNCHING

without tool change



The NEW Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

Write for detailed information

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH (23), PA.

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

22

Pipeline Authority Granted

San Francisco—Authority to construct an $85 million natural gas pipeline connecting gas reserves in the Texas-Louisiana Gulf Coast area with the Midwest has been granted by the Federal Power Commission to the Trunkline Gas Supply Co., Ralph K. Davies, president, announced last week.

The project calls for construction of a 1500-mile 22 to 26-inch pipeline, stretching from the Gulf Coast to connect initially at Palmyra, Nebr., with facilities of Northern Natural Gas Co. Work on the project will begin immediately.

Iron Ore . . .

Iron Ore Prices, Page 154

Cleveland — Shipments of Lake Superior iron ore totaled 8,868,286 tons in April, an increase of 1,191,016 tons or 15.51 per cent over the total for the like 1948 month, according to the Lake Superior Iron Ore Association, this city. This brought the season's total to 9,367,579 tons, an increase of 1,690,309 tons or 22.02 per cent over the like period a year ago.

Canada . . .

Toronto, Ont.—Supply of iron and steel in Canada from domestic producers continues tight, with mills booked solidly through third quarter. However, there has been considerable easing in the overall situation due to improvement in imports from the United States, which now are ample to take care of most needs.

Consumers are reluctant to take imported steel when domestic steel is available. This is due to the fact that steel materials from the United States and Europe are moving at higher prices than those from Canadian mills whose prices still are under price ceilings. With supply in better volume, consumers in most instances are holding purchases to current needs so as to take advantage of any price reductions that may develop in the future. While a buyers' market is making its appearance in the United States, Canadian producers are still in command of the situation and are handing out supplies on a quota basis and are far behind in meeting requirements.

Production in Canada is at the highest rate in history and mills are operating at virtual capacity, being only hampered in rolling departments by insufficient steel.

While there has been a moderate falling off in demand for foreign iron and steel in Canada, this may be partly due to the fact that consumers are not maintaining large inventories. On the other hand, there has been no abatement in demand for domestic produced steels, which, when available, are at prices well under imported lines. It is reported that substantial tonnages of steel are slated for early delivery from Europe, but here again prices will be well out of line with those quoted by Canadian mills.

Demand for steel plate, black and galvanized sheets continues heavy with supplies from Canadian mills short, but some easing reported in imported materials. Carbon bars also are in short supply with demand absorbing all materials available, whereas alloy bars are in good supply and producers are looking for business in export markets. Increased imports of structural shapes from the United States and Europe have eased the supply situation in these materials and a number of construction projects that have been in abeyance for the past two or three years are to be started without further delay. Wire and nails are still on the hard-to-get list, but it has been announced from Ottawa arrangements have been made with Washington whereby Canada will receive 1200 tons of wire rods from the United States which will add 138,000 kegs of nails to production over the next six months.

Merchant pig iron demand is holding at a high level, with producers making available to merchant melters about 8000 tons per week, about half the current needs.

No improvement is reported in scrap. Steel grades are decidedly scarce and there is not sufficient domestic supply to meet requirements, thus consumers are forced to look to foreign sources of supply. So far there has been no reduction in steel production due to scrap shortage. Some improvement is reported in offerings of iron grades.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

600 tons, Detroit dam, Oregon state, to unstated interests; Consolidated Builders, general contractor.

325 tons, Turnagain bridge, Alaska, to Allied Steel Fabricators, Chicago; J. J. Badraun, Seattle, general contractor.

300 tons, fabricating plant for Puget Sound Sheet Metal Works, Seattle, to The Austin Co., Cleveland, also general contractor.

260 tons, laboratory building, Mercersburg Academy, Mercersburg, Pa., to Bethlehem Steel Co.

110 tons, store, W. T. Grant Co., Leominster, Mass., to Grossier & Shlager Iron Works, Somerville, Mass.

100 tons, store building, River Ave. and 161st St., New York, to Grand Iron Works Inc., that city.

100 tons, bridge, West Peterborough dam, Hancock, N. H., to Grossier & Shlager Iron Works, Somerville, Mass.

STRUCTURAL STEEL PENDING

15,000 tons, state bridge, Penrose Ave., Philadelphia; Bethlehem Steel Co., low bidder.

1000 tons, engine overhaul building, naval aviation station, Quonset Point, R. I.; bids May 23.

800 tons, sewerage disposal plant, for Nassau county, Hempstead, Long Island; bids May 16.

750 tons, state bridge, Woodbridge, N. J.; J. M. Chapman & Sons, Hillside, N. J., low on general contract.

600 tons, school and convent, St. Elizabeth Roman Catholic Church, Bronx, New York; bids closed May 6.

400 tons, plant, American Can Co., Milwaukee; bids pending.

228 tons, state bridge, Warren county, Pennsylvania; bids opened May 6.

200 tons, platform work, Delancy St. subway station, Board of Transportation, New York; bids closed May 6.

200 tons, elementary school, New Canaan, Conn.; bids May 16.

190 tons, 158-foot beam bridge, Springfield, Vt.; bids May 13, commissioner of highways, Montpelier.

Unstated tonnage, state bridge across the Hud-

son, Mechanicsville, N. Y.; bids May 25.

Unstated tonnage, state highway bridge, Monroe county, New York; bids May 25.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1175 tons, building, Hathaway Bakeries Inc., Brighton district, Boston, to Bethlehem Steel Co.; E. J. Rappoli Co., Cambridge, general contractor.

1900 tons, Detroit dam, Oregon state, to unstated interests; Consolidated Builders, general contractor.

300 tons, military projects in Alaska and miscellaneous construction, to Bethlehem Pacific Coast Steel Corp., Seattle.

200 tons, miscellaneous construction, to Northwest Steel Rolling Mills Inc., Seattle.

200 tons, two dormitory buildings, Rhode Island State College, Kingston, R. I., to Bethlehem Steel Co.; E. J. Rappoli Co., Cambridge, Mass., general contractor.

REINFORCING BARS PENDING

1200 tons, state bridge, Penrose Ave., Philadelphia; Bethlehem Steel Co. low bidder.

1000 tons or more, Alaska Native hospital, Anchorage; joint bid by Morrison-Knudsen Co., J. C. Boespflug and Peter Kiewit Sons, Seattle, $4,509,254, low.

500 tons, Winchester wasteway, Columbia Basin project; bids in to Bureau of Reclamation, Denver.

Unstated, Portland branch Federal Reserve Bank; Ross B. Hammond Co., Portland, Oreg., low $1,761,300.

PLATES . . .

PLATES PLACED

1500 tons, Detroit dam, Oregon state, to unstated interests; Consolidated Builders, general contractor.

PLATES PENDING

Unstated, 250,000-gallon water tank; bids to District No. 74, Seattle, May 10.

PIPE . . .

STEEL PIPE PLACED

215 tons, 30 and 36-inch welded pipe, Sun Oil Co., Toledo, O., to Bethlehem Steel Co.

STEEL PIPE PENDING

Unstated, 50,000 feet 4 to 10 inch steel pipe and fittings; bids to District No. 75, Seattle, May 10.

Unstated, 5000 feet 8 and 10 inch welded steel pipe; bids to F. Minks, clerk, Entiat, Wash., May 12.

CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—Standard Casket Mfg. Co., c/o Miller, Martin & Lewis, architect, Title Guarantee Bldg., has awarded a $439,000 contract to Brice Building Co., 1021 Second Ave. N., for construction of a plant.

ARKANSAS

PINE BLUFF, ARK.—Pinecrest Cotton Mills Inc. is building a $1.8 million plant; contract let to Clyde Smithwick, 1606 W. 24th St., Pine Bluff, and William Peterson, Commercial National Bank Bldg., Little Rock, Ark.

CALIFORNIA

CULVER CITY, CALIF.—Hughes Aircraft Co. has awarded a $150,000 contract to T-S Construction Engineering Inc., 600 St. Paul Ave., Los Angeles, for construction of a plant addition.

VERNON, CALIF.—Central Mfg. Distributor, General Electric Co., 4814 Loma Vista,

You Can Depend on

"HERCULES" (RED-STRAND) WIRE ROPE

Here is a Wire Rope with extra stamina that is built to give safe, dependable and economical service—even on the toughest jobs. As it is made in Round Strand and Flattened Strand constructions—Preformed and Non-Preformed—there is a correct type for every requirement.

We Invite Your Inquiries.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

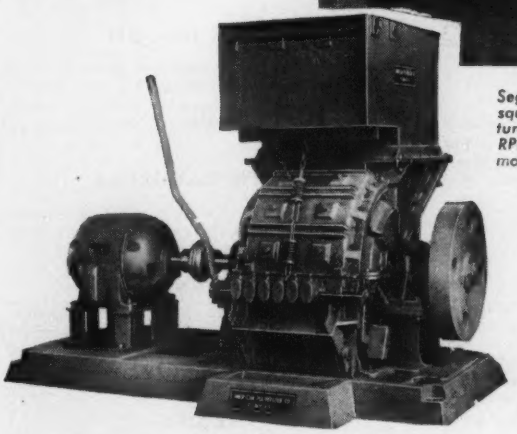
ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MO., U. S. A.

NEW YORK 6 • CHICAGO 7 • HOUSTON 3 • DENVER 2
LOS ANGELES 21 • SAN FRANCISCO 7 • PORTLAND 9 • SEATTLE 4

TOP SCRAP VALUE and TOP CUTTING-OIL RECOVERY

Segregated turnings being fed to special square hopper of an American #2400 metal turnings crusher, powered by 50 HP 900 RPM motor. Crown Cork & Steel Co., Baltimore.



THE AMERICAN METAL TURNINGS CRUSHER

Long, curly turnings of steel, alloys, brass, aluminum, etc. are rapidly reduced to easily-handled chips, requiring only a fraction of usual storage space and increasing cutting oil reclamation to 30 to 50 gallons per ton.

Americans soon pay for themselves!

Send for bulletin on "Crushing Turnings Profitably".

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1539 MACKLIND AVE.
ST. LOUIS 10, MO.

St., has awarded a $150,000 contract to W. P. Neal, 4814 Loma Vista St., for construction of a warehouse and office.

IDAHO

POCATELLO, IDAHO — Westaco Chemical Corp., 405 Lexington Ave., New York, will build a $70,000 plant addition, separate contracts; United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, engineer.

ILLINOIS

CHICAGO—E. H. Sargent & Co., 155 E. Superior St., will build a factory; Olsen & Urbain, 5 S. Wabash St., architect.

CHICAGO—Chicago, Milwaukee, St. Paul & Pacific Railroad will build an engine house; R. J. Middleton, chief engineer, Union Station.

INDIANA

INDIANAPOLIS — Mouldings Inc., 730 E. Washington St., has awarded a $500,000 contract to Industrial Operations Inc., 319 N. Pennsylvania St., for construction of a manufacturing plant, S. Holt Rd. and Farnsworth Ave.

IOWA

DAVENPORT, IOWA — Englehart Mfg. Co., 107 Scott St., has awarded a $125,000 contract for a plant to John H. Soller Construction Co., 717 Harrison St.

DES MOINES, IOWA—Iowa Farm Bureau Federation, Farm Bureau Bldg., has awarded an $800,000 contract to John J. Harte Co., Forsythe Bldg., Atlanta, for construction of a plant.

KANSAS

MINGO, KANS.—Mingo Co-operative Association has awarded a $150,000 contract to Thompson-Vickory Construction Co., Salinas, Kans., for construction of a grain elevator.

LOUISIANA

NEW ORLEANS — American Radiator & Standard Sanitary Corp., c/o contractor, has awarded a $68,000 contract to R. P. Farnsworth & Co., 1515 S. Salcedo St., for construction of a plant.

MICHIGAN

BATTLE CREEK, MICH.—Eaton Mfg. Co., 739 E. 140th St., Cleveland, will spend $2.5 million in an expansion program for new machinery and equipment necessary for production of compressor blades for jet engines at its plant here.

MISSISSIPPI

MERIDIAN, MISS.—General Box Co., c/o McNair & Archer, architect, Rosenbaum Bldg., has awarded a $343,816 contract to L. B. Priester & Son, for construction of a plant and office.

MISSOURI

ST. JOSEPH, MO.—M. K. Goetz Brewing Co., Seventh St. and Albermarle St., has awarded a $600,000 contract for a shop to Lehr Construction Co., 2115 Frederick St.; Everett Johns, Empire Trust Bldg., architect.

NEW JERSEY

BOUND BROOK, N. J.—Research Corp., 405 Lexington Ave., New York, has awarded a $1 million general contract for construction of a plant to Michael Riesz & Co. Inc., 871 King Georges Rd.; plumbing and heating to Richardson Engineering Co., 301 Burnet St., New Brunswick, N. J.; electrical work to James H. De Laplaine, 125 Raritan Ave., Highland Park, N. J.

NEW YORK

CARTERET, N. Y.—Westaco Chemical Corp., 405 Lexington Ave., New York, has awarded $150,000 separate contracts for a plant expansion; United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, engineer.

OHIO

AKRON—B. F. Goodrich Co. is building a $5 million industrial rubber belt factory, Falor St.

CLEVELAND—Sheldon Products Co. has been formed by Fred Jacobson, 2637 Hampshire Rd., Joseph Warhaft and A. S. Berger, to manufacture and deal in electrical, mechanical, and metal mercantile specialties and machines.

CLEVELAND—A 1000-mile crude oil pipe line from Texas to Ohio will be built jointly by Standard Oil Co. of Ohio and Sun Oil Co., to cost $56 million. The two companies have organized the Mid-Valley Pipeline Co., an Ohio corporation, to construct and operate the line.

CLEVELAND—Cleveland Cap Screw Co. will spend $500,000 in an improvement program to include a chemical and physical laboratory, the third unit of plant No. 2, E. 79th St. near Bessemer Ave.

ORVILLE, O.—Quality Castings Co. is building a magnesium foundry building.

OREGON

PORTLAND, OREG.—Acme Steel Co. has purchased property at 2044 N. W. Pettygrove St., for sales office and warehouse.

PORTLAND, OREG.—Barde Steel Co. has acquired title to its local plant and additional area for expansion from Union Pacific Railway. The purchase involves 17½ acres.

PENNSYLVANIA

MCKEESPORT, PA.—National Tube Co. has awarded separate contracts for $500,000 for construction of a sintering plant.

PHILADELPHIA — Keystone Wire & Iron Works, 19th and Clearfield Sts., has awarded separate contracts for $68,000 for a storage building.

PHILADELPHIA—Peter Luciany, 1502 E. Passyunk Ave., has awarded separate contracts, $68,000, for construction of a manufacturing building; Herman Kline, 1211 Chestnut St., architect.

SCRANTON, PA.—Archers Brill Mfg. Co., Lackawanna Ave., has awarded a $150,000 contract to Breig Bros. Construction Co., Real Estate Bldg., for construction of a plant; Von Storch & Pearce, Scranton Lackawanna Trust Bldg., architect.

SHENANDOAH, PA. — Shenandoah Chamber of Commerce has awarded a $235,000 contract to Schneider & Davis, Pottsville, N. Y., for construction of a factory; Frank Mfg. Co., 1441 Broadway, New York, lessee.

WAYNE, PA.—Wayne Printing Co., 134 N. Wayne Ave., has awarded a $100,000 contract to Howard L. Croll, 74 St. Davids Rd., St. Davids, Pa.; Duffield Ashmead Jr., Commercial Trust Bldg., Philadelphia, architect.

RHODE ISLAND

PROVIDENCE, R. I.—Meldon Store Fixtures Co. Inc., 314 Blackstone St., will build a $100,000 shop, showroom and 20 stores, Washington, Westminster and Lafayette Sts.

SOUTH CAROLINA

GREENVILLE, S. C.—Keys Printing Co. has awarded a $129,613 contract to McKoy-Helgerson Co. for a plant.

TENNESSEE

CARTHAGE, TENN. — Upper Cumberland Membership Corp. will build a $100,000 warehouse and office; Walk C. Jones-Walk C. Jones Jr., 1215 Poplar St., Memphis, Tenn., architect.

TEXAS

AGUA DULCE, TEX.—Panhandle Producing & Refining Co., City National Bank Bldg., Houston, has awarded a $750,000 contract to Jones & Laughlin Supply Co., 108 N. Trenton St., Tulsa, Okla., for construction of a plant.

AMARILLO—TEX.—Minneapolis-Moline Power Implement Co., Minneapolis, will build a $300,000 warehouse and shop building, 3400 E. Eighth St.; contract will be let about May 15.

DALLAS—Dallas Power & Light Co., 1506 Commerce St., will build a $325,000 generator house, 2707 Flynn St.

DALLAS—Vinson Supply Co., 3331 Hanger St., has awarded a $112,500 contract to Henger Construction Co., 1600 Dallas National Bank Bldg.; Grayson Gill, 1913 San Jacinto St., architect.

DALLAS—Plans for a bank and office building, to cost in excess of $2 million, have been announced by Republic National Bank and Cary-Schneider Investment Co.; site is on Pacific Ave.

GRAPELAND, TEX.—Geier-Jackson Inc. will build a $325,000 gasoline refining plant, own forces.

HOUSTON—Gulf Oil Corp. will spend $1 million in exploration and developing oil reserves, mostly in Texas.

HOUSTON — American Can Co., Southern Lockwood and Clinton Dr., has awarded a $600,000 contract to W. S. Bellows Construction Co., 716 N. Everton St., for construction of a plant; R. F. Mayan, c/o owner, engineer.

WICHITA FALLS, TEX.—Panhandle Refining Co., P.O. Box 1191, has awarded a $125,000 contract to Jones & Laughlin Supply Co., 108 N. Trenton St., Tulsa, Okla., for construction of warehouse, welding and machine shops at refinery.

WASHINGTON

PASCO, WASH.—United Truck Lines has awarded a $100,000 contract to Pete J. Young & Sons Construction Co., E. 1211 Columbia St., for construction of a terminal.

SEATTLE—Seattle light department has called bids June 8 for three 100,000 kva generators for installation at Ross dam. A fourth unit will be advertised later. Bids will be received May 11 for 100-ton electric traveling crane, also a 10-ton similar type crane.

SEATTLE—Bids for four additional contracts for new construction and completion of military installations in Alaska have been called May 24. They will be subcontracts to Birch, Johnson & Lytell, general contractor, under supervision of United States engineer. The projects include headquarters, barracks, warehouses and fire station at Fort Richardson, Ladd and Eielson air fields.

SPOKANE, WASH.—Centennial Mills, Central Bldg., Seattle 4, has awarded a $204,000 contract to Henry George & Sons, Hutton Bldg., for construction of storage elevators.

WISCONSIN

MILWAUKEE—Greenebaum Tanning Co., 4763 N. 33rd St., has awarded a $175,000 contract to Siesel Construction Co., 514 E. Ogden Ave., for construction of a boiler house; Grassold & Johnson, architect, and Moe, Gates, Weiss & Papenthien, engineer, both 734 N. Jefferson St.

ALASKA

ANCHORAGE, ALASKA — Alaska Railroad will receive bids May 11 for a 12-mile joint railroad and highway project in Turnagain area, for which $2,800,000 are available.

CANADA

EDMONTON, ALTA.—Park & Miller, 7 104th St., has awarded a $200,000 contract to Western Construction Co., 7 Imperial Bank Bldg., for construction of a warehouse; Neil McKernon, Credit Foncier Bldg., architect.

VANCOUVER, B. C.—Spokane, Portland & Seattle Railway will build a concrete diesel locomotive shop. General contract has been awarded Wegman & Co., Portland, Oreg.

MONTREAL, QUE.—Canadian Tube & Steel Products Ltd., 5575 Hamilton St., will build a $150,000 plant; E. C. Miller, 485 McGill St., architect; T. Pringle & Son Ltd., 485 McGill St., engineer.

MONTREAL, QUE.—Turner & Newall Ltd., Rochdale, England, has awarded a $250,000 contract to Anglin Norcross Quebec Ltd., 892 Sherbrooke St. W., for construction of a factory; E. C. Miller, 485 McGill St., architect; T. Pringle & Son Ltd., 485 McGill St., engineer.